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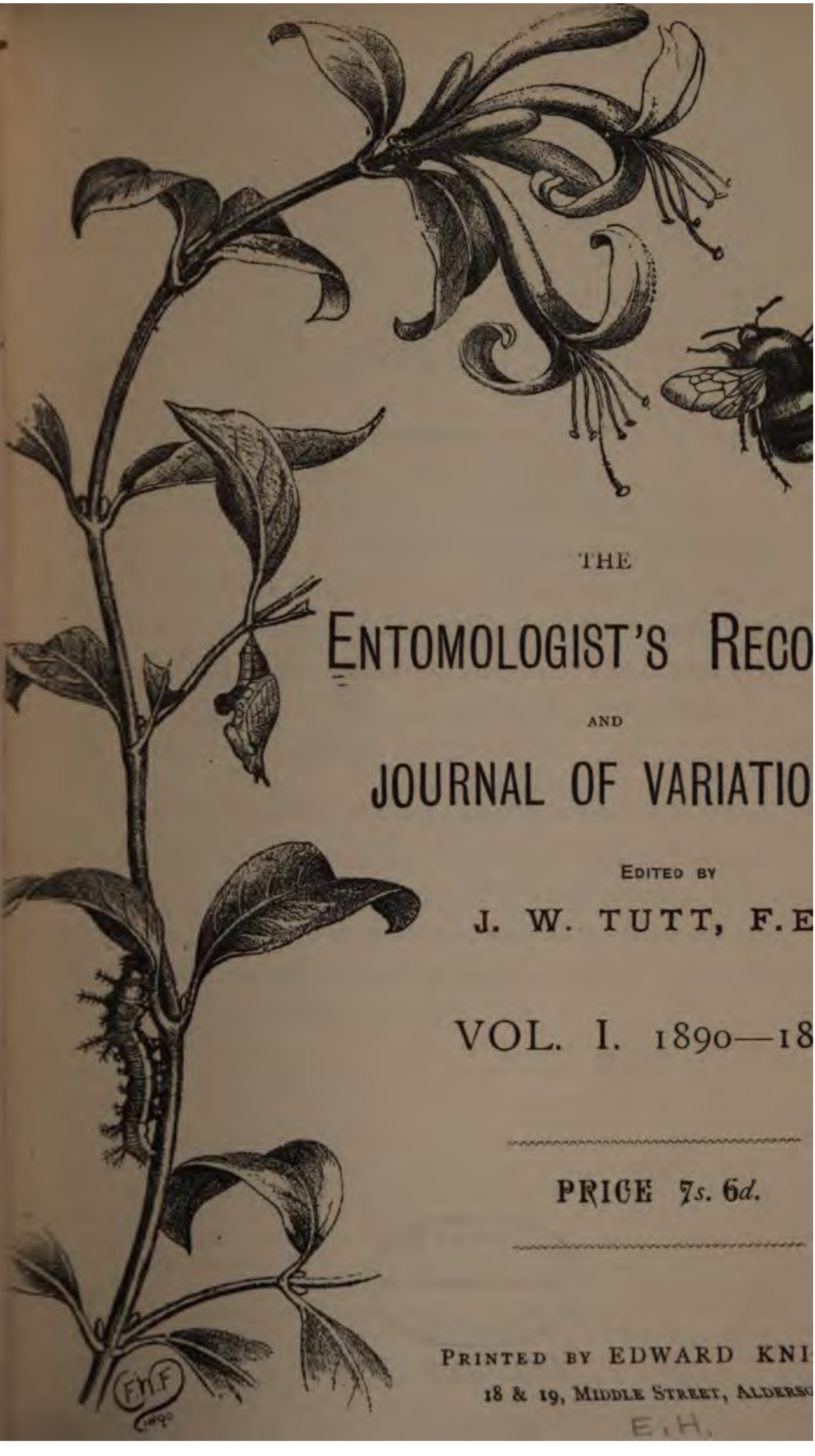

THE

ENTOMOLOGIST'S RECO

AND

JOURNAL OF VARIATIO

EDITED BY

J. W. TUTT, F.E

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PREFACE TO VOLUME I.

In presenting Vol. I. to our readers, we beg to thank most heartily all those entomologists who have so cordially supported us, by subscribing to the Magazine, and by sending us material for publication. It has been our aim to make the Magazine as popular as possible, consistently with no decrease in its scientific value. That our method has been appreciated the success of the Magazine fully proves.

The general tendency of a large number of readers to require a complete index for scientific reference has led us to compile a complete "Special Index," containing every reference in the Magazine. This will be published separately, price 1s., and we trust that our subscribers will buy this, so that no loss may fall on our enterprising proprietor.

THE EDITOR.

The Entomologist's Record

AND

JOURNAL OF VARIATION.

No. 1. Vol. I. April 15th, 1890.

THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

The genus *Acronycta* contains species that are individually of considerable interest, and as a group, presents many points of attraction, both to the systematist and to the field naturalist. My own attention was drawn to the group many years ago. In rearing *Simyra venosa* (*Arsilonche albovenosa*), I felt convinced that its relationship to *Acronycta rumicis* was much closer than was recognised; and the curious brotherhood of *psi* and *tridens* always had a fascination for me; then, some years ago, in rearing *A. alni* the variation of one specimen in the number of its moults, a subject I felt interested in, made me desirous of more closely studying the group. It is only recently that I have been able to do so, and in these notes I propose to record some of the results.

So far as I know, no details such as I have brought together of the earlier stages of the Acronyctidæ have been published in England, nor, indeed, on the Continent; but this is merely a confession of my ignorance of Continental literature. The imagines have been abundantly dealt with, and the full-grown larvæ will no doubt be exhaustively treated in an early volume of Buckler's larvæ. I have therefore rather passed these stages by in recording my observations. As I gained knowledge and experience of the group I found that I had missed in those species first dealt with, several points worthy of note, and of all, I am not so industrious in taking full notes as not to leave much to be desired.

I may refer here to a paper in the *Transactions of the Entomological Society* for 1879, by Mr. A. G. Butler, which propounded such extraordinary ideas that I felt it was necessary that further research should confirm or refute them, and I may say at once that it proves to be a case in which one's natural suspicion is well founded, and not the result of mere prejudice and habit.

Although the genus *Acronycta*, as represented by our British species, naturally divides itself into three very distinct and well-marked groups, and though some species, hitherto placed in separate genera, such as *venosa* already referred to, seem closer to one of these groups than these groups are to each other, the genus, without precisely defining its limits at present, is very distinct from other families of the NOCTUÆ and from any group of BOMBYCES. Some of the outlying species that have at different times been referred to in this group, present some difficulty in deciding whether they really belong to the ACRONYCTIDÆ or not, and with what other groups they have more or less affinity—such species are *orion*, *coryli*, *cœruleocephala*. But leaving these for the moment on one side, and confining our attention to the species more typical of the genus and group, we find certain points of affinity throughout all their stages that bind them together and distinguish them from other families.

The egg is low dome shaped, that is, it consists of a segment of a sphere, always less, usually much less, than a hemisphere, lying on its flat side, and ribbed from the summit to the circumference in a way that I have learned to regard as characteristic of NOCTUÆ, though I am not able to distinguish it by description from that met with in other groups; the typical NOCTUA egg, though ribbed in this manner, is usually more or less spherical.

The most characteristic stage is the newly-hatched larva. It tends to have certain segments pale and others dark, but in all cases the eleventh segment is paler, smaller, and "weaker" than the rest; it is occasionally a little broader than the others, but it is always lower and flatter, and its tubercles and bristles are smaller and less developed. This relative development of the eleventh segment persists in many species throughout the life of the larvæ, even to the full-grown period; in *alni*, for instance, this segment has no clavate hairs.

I may note that I describe the head as segment one, as is, I think, now universal; but I mention the matter, as I find descriptions of *Acronycta* stating the *eleventh* segment to be large, tuberculated, etc., these count the segments, omitting the head, and refer to the large *twelfth* segment.

The pupa is less characteristic; it serves rather to divide the genus into the three characteristic groups I have referred to than to define the group as a whole. The pupa of the *rumicis* group is very characteristic and rather bombyciform in its aspect. The others are more of an ordinary NOCTUA pattern, but present features that separate them from other families. This is perhaps a somewhat rash statement to make, since I must confess my knowledge of NOCTUA pupæ is of a rather superficial character.

Of the imago I find my superficial knowledge of other groups compels me to speak with much diffidence. Still I think the dagger mark at the anal angle has some distinctive features. Below the median vein there follows another, usually, I think, called the first sub-median; but in the long space between these, extending from the base to the hind margin, there is sometimes another, or "intermediate" vein. This is very distinct in *Liparis monacha*, the arched black marks in which show the spaces on each side of this intermediate vein, between it and the median on the one hand and the sub-median on the other, to be of equal value with the other spaces between the veins.

In *Acronycta* this intermediate vein is represented by a trace only, towards the hind margin, and the spaces above and below it are reduced to less than two spaces, but are still rather more than one, the vein is marked by the line of the "dagger" (take *psi* as an example) and the fringe presents two black marks, one for each inter-space, placed closely together, and not regularly spread as in the rest of the wing. In what I take to be a typical NOCTUA, this intermediate vein is entirely wanting, but there are several groups in which it may be found, not so distinctly as in *Acronycta*, but in which, nevertheless, it might be described in almost the terms I have used in regard to that genus. The ORTHOSIDÆ and the genus *Xylina* occur to me as such instances.

Acronycta certainly has some affinity to the BOMBYCES, probably most to *Liparis*, and the genus *Cymatophora* appears also to have relationship with other groups regarded as true BOMBYCES, and for these reasons the genera *Acronycta* and

Cymatophora are placed in contiguous families; this is unfortunate, as I am convinced they are in no way related, not so much so, perhaps, as *Plusia* is to *Leucania*. I hardly know in what points they agree, whilst the ova are very distinct, that of *Cymatophora* and *Thyatira* being more of a *geometrid* (or perhaps *Bombyx*) pattern than that of a NOCTUA. If the CYMATOPHORIDÆ were placed in the BOMBYCES, it would not materially increase the heterogeneous character of that division.

Acronycta, as represented in Britain, divides itself naturally into three sections, which really are distinct genera rather than sub-genera.

The first of these is the *Rumicis* group, consisting of

1. Auricoma.
2. Myricæ.
3. Menyanthidis.
4. Venosa.
5. Rumicis.

These are very closely related, and hardly admit of subdivision, although *venosa*, on the ground of the coloration of the imago, may be so separated for convenience.

The second group consists of—

6. Psi.
7. Tridens.
8. Strigosa.
9. Alni.
10. Megacephala.
11. Leporina.
12. Aceris.

This group is not so homogeneous as the first, and may be sub-divided, if fancy so dictates, into sub-genera, of which each species, except the two first, will represent one. Such subdivision might be desirable if one were dealing with the ACRONYCTIDÆ of the whole world. The best character on which to found the sub-divisions will be found in the relative positions of the pale and dark segments of the newly-hatched larvæ.

The third group contains only one species—

13. Ligustri,

and is so different from the others as to justify the doubts as to its being a true *Acronycta* that have been held; it agrees with them, however, in the form and sculpturing of the egg, and in the "weak" eleventh segment of the young larva, though this feature is less pronounced than in the other groups.

(*To be continued.*)

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

"MELANISM" in Lepidoptera is a subject which has now and again been brought before the entomological public, and discussions as to its origin and distribution have occasionally taken place in the British entomological journals. In these discussions, the subject was generally treated from an insular point of view, until Mr. Dobrée (*Entom.* xx., pp. 25–28) endeavoured, by comparing our melanic forms with the forms of the same species obtained on the Continent, to correlate the facts obtained, and to show the real relation that not only our melanic, but also our ordinary forms bore to the Palæarctic lepidopterous fauna, and to deduce reasons for the melanism so prevalent in our British forms. In dealing with melanism it is advisable in the first place to bear in mind what we include in that term. Melanism, properly speaking, refers only to an increase in the quantity of actually *black* markings at the expense of any other colour. It has not been customary, however, to base or confine our arguments to this restricted view of the subject, but any darkening of the ground colour, whether black or not, has been included in a general way in the term. However, as this was not strictly correct, Dr. F. Buchanan White (*Ent. Mo. Mag.*, vol. xiii., p. 145) suggested for this general darkening of the ground colour the term "melanochroism," whilst the opposite phase of variation, the development of a paler pigment at the expense of a darker, he called "leucochroism." Thus, *Amphidasys betularia* var. *doubledayaria*, is a case of true "melanism." The development of buff and yellow coloration, instead of white, in *Arctia menthastri* is a case of "melanochroism." It will be seen that most of the cases referred to in the discussions on "melanism" are really not true melanic forms, but really melanochroic forms, because the species are but rarely suffused actually with black, although there may be a great deepening in the ground colour, the depth of the colour being, however, frequently increased by a colour other than black. A good example of "leucochroism" is that of *Arctia plantaginis* var. *hospita*. In this variety the orange of both the anterior and posterior wings is replaced by white.

I believe Mr. Cockerell was the first entomologist who attempted directly to connect certain forms of melanic variation with an excess of moisture, although in the *Ent. Mo. Mag.*, vol. xiii., p. 148, Dr. Buchanan White stated most explicitly that he believed the exciting cause of melanism was to be looked for in certain meteorological conditions. However, a paper that Mr. Cockerell read before the members of the South London Ent. and Nat. History Society (*Transactions S.L.E. and N.H.S.*, 1887, pp. 103, 104) caused me first to give particular attention to it. It struck me at once that a great deal of the melanism and melanochroism of our Islands could be better explained by this theory—in combination with "natural selection,"—than by any other that had been presented to us. Our greatest authority on Continental NOCTUÆ, Mr. N. F. Dobrée, wrote an article (*Entom.* xx., pp. 25–28), previously referred to, disproving the general notion that melanism was characteristic of high latitudes, and pointing out the following facts:—(1). That melanism scarcely ever occurred in such latitudes. (2). That at any latitude, dry open areas produced more brightly and clearly marked forms of lepidoptera, and (3). That the North of Europe produced, practically, no melanic forms, neither did the South, but that the melanism of the Continent was confined almost entirely to certain Alpine districts. This was followed up (*Entom.* xx., pp. 58, 59) by a short article from Mr. Cockerell, who, of necessity accepting Mr. Dobrée's facts, disagreed with that gentleman's deductions and conclusions, and suggested, that the areas where melanism was prevalent were more or less humid, and that humidity had probably more to do with melanism than food or any other cause. Since I have devoted my attention to the matter, the information I have been able to gather helps to confirm Mr. Cockerell's view.

Taking into account the physical geography of Europe, what do we find are its broad, general, meteorological and climatic characters? (1). That the great central plain, comprising Russia, Northern Germany, Holland, Belgium, and Northern France, is swept by the prevalent east winds, which, having traversed Siberia, are totally devoid of moisture, and that consequently this area has a comparatively small rainfall, and has exceptionally dry air.

(2). That the great central mountain chain, the Alpine-Carpathian range, running through Europe, east and west, has a much heavier rainfall and moister atmosphere, due to condensation, than the great central plain.

(3). That the district south of the central mountain chain, which may be said to border the Mediterranean littoral, is subject occasionally to heavy rainfalls, but has an atmosphere remarkably clear.

Here, then, we have two great areas, one north and the other south of the great central chain, where the air is comparatively dry and clear, and in these areas we find little or no traces of melanochroism, or darkening of colour; but in the more humid mountainous districts we get forms closely resembling our own melanic (but not extreme) forms, as the term " alpine," so frequently applied to mountain forms from the Continent, and to the ordinary forms obtained in this country, testifies.

I would now call attention to the general facts mentioned by Mr. Dobrée (*Entom.* xx., pp. 25–28), where, after citing numerous examples, he states in his excellent paper:—" This at once fixes the fact that melanism is of purely British occurrence, thereby upsetting the assumption of our theorists, that darker colouring and smaller size is a feature of high latitudes," etc. " If we once more return to our starting point—in Central and Southern Germany—and turn our eyes southwards, it will be found that the prominent features of lighter colour and fainter markings of high northern latitudes again become apparent," etc. " The absence of melanism in Continental Europe is not, however, without its exceptions, for in the high Alps of Switzerland, Styria, and Carniola it occasionally appears," etc. " The inference can be drawn, that melanism is primarily due to the peculiar geographical position of these Islands."

(*To be continued.*)

NOTES ON LITA (GELECHIA) JUNCTELLA.

By J. W. TUTT, F.E.S.

KNOWING how difficult it is after a few years' delay to trace information relative to some of our local species, I think it advisable to write a short note about *Lita (Gelechia) junctella.* In *Entom.* xx., p. 293, I gave a summary of six species of this difficult group, which are now clearly distinguishable and easily identified by our Micro-lepidopterists. But on the same page is a note about *L. junctella,* which then was (and now is) rather a thorn in our flesh. Here, too, I fell into error in suggesting that Messrs. Threlfall and Hodgkinson's species was obtained from the coast, although Mr. Threlfall (*Entom.* xx., p. 65,) says that his specimens came from the "woods and lanes near Witherslack." I compared one of Mr. Threlfall's specimens with Mr. Stainton's (principally Continental) series, and it did not appear to tally with them; but afterwards receiving specimens captured in Silesia, I could detect no reliable point of difference, and became satisfied that the Witherslack *junctella* and the Silesian *junctella* were identical. The protean *semidecandrella* has a reddish (almost orange) form which runs it close, but a long series shows that they are distinct enough. In 1889, when the Messrs. Salvage were collecting at Forres, they captured specimens in every way identical with the Lancashire and Silesian species. I have two of their specimens, and Mr. W. H. B. Fletcher sent me fourteen specimens which he had received from them. Strange to say, Messrs. Hodgkinson and Threlfall always maintained that their species hybernated; all the specimens taken by the Messrs. Salvage were hybernated ones. With the Witherslack, Silesian, and Forres specimens (all evidently the same species) before me, their perfect distinctness from all the other members of *Lita* was very clear although difficult to define; the insect was most closely allied to *semidecandrella*, but was rather stouter and had the characteristic orange spot before the fascia well defined, but what struck me most was the character of the fascia; in *junctella* the fascia is particularly constant, being either straight or very slightly curved, but with no distinct angulation, while in *semidecandrella* the fascia is almost always distinctly angulated, although the latter species presents some variations in this character, and some specimens have the angulation very slight compared with others. Mr. W. H. B. Fletcher also writes (comparing these species):—"It seems to me that the northern moths have both antennæ and palpi darker than the others. It is not fair, however, to compare hybernated specimens with bred ones." Besides the difference in the habitats of these species, *junctella* being a wood or hedge-frequenting species and obtained from tree-trunks, while *semidecandrella* is obtained from our bleak sandhills, and has to be disturbed from the marram grass, *junctella* occurs later than its ally. The latter (*semidecandrella*) is well out in July, and so far as we know does not hybernate; the former appears in August, and the hybernated specimens are taken on tree-trunks in the following spring.

There is no doubt the name *junctella* was a misnomer.

Junctella may be taken on fir trunks, and beaten out of yew-trees (as is the case both at Forres and Witherslack), just in the same way as Mr. Stainton and myself always appear to associate with, and capture *maculiferella* about hawthorn; but there is very little doubt that all these closely-allied species feed on some species of *Caryophyllaceæ*, and that they go to the larger plants for shelter.

Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

SCIENTIFIC NOTES.

American Species representative of European.—The North American species, in many instances, bear a very remarkable general resemblance to those of Europe; and this is especially so with the Rocky Mountain region—take Colorado for instance. I see *Vanessa cardui* here every day, and meet with such species as *Cidaria populata*, *Nomophila noctuella*, etc., while numbers of species are "representative," *e.g.*:—

Parnassius Smintheus, D. and H.	represents	*P. apollo.*
Pieris oleracea, Haw.	,,	*P. napi* (but is paler).
Vanessa milbertii, Godt.	,,	*V. urticæ* (darker).
Cœnonympha ochracea, Edw.	,,	*C. pamphilus.*
Smerinthus astarte, Strecker	,,	*S. ocellatus* (greyer).
Clisiocampa Californica, Pack.	,,	*C. neustria* (especially in larval stage).
Calocampa cineritia, Grote.	,,	*C. exoleta.*
Catocala Californica, Edw.	,,	*C. nupta.*
Metrocampa perlaria, Guen.	,,	*M. margaritata* (paler).
Alucita montana, T.D.A.C. ms.	(probably n.s.)	*A. hexadactyla.*

And so on *ad infinitum.* (For some very interesting remarks on this subject see Packard, in *Ann. Report U.S. Geol. and Geog. Survey*, Hayden, for 1873, 1874).—T. D. A. Cockerell, West Cliff, Colorado, U.S.A.

Mr. A. G. Butler's "Synonymic Notes on the Moths of the Early Genera of Noctuites."—(From the *Transactions of the Entomological Society of London*, pp. 375–387). In the *Transactions of the Ent. Soc. of London*, just issued, is a paper by Mr. A. G. Butler, in which he deals with the synonymy of certain Noctuæ. Most of these are exotic, and I am unable to criticise the results obtained; but the synonymy of the British species included appears to call for some remark. They are:—

1. On page 380 *Peridroma ypsilon*, Rott. = *Noctua saucia*, Hb. ("Schmet," fig. 378) = *Agrotis differens*, Walk., etc. Is the latter name (*differens*) synonymous with *saucia*, Hb. or *ypsilon*, Rott.? It cannot be a synonym of both, because *ypsilon*, Rott. does not = *saucia*, Hb. but = *suffusa*, Hb. (fig. 134). This is the accepted synonymy of *ypsilon*, and we call our British *suffusa* by the name of *ypsilon* at the present time. Perhaps, however, Mr. Butler has the original description of

ypsilon, Rott., and means to question the accuracy of the present accepted synonymy, and can justify his use of the name in this new direction.

2. On page 377 *Agrotis subgothica*, Haw. = *Feltia ducens*, Walker. As is well known to British lepidopterists, *subgothica*, Haw., is not a distinct species at all, but simply a synonym of *A. tritici*, Linn., or at most a variety of that species. Why does Mr. Butler treat *subgothica* as a distinct species? Is there any fresh reason for treating it thus?

I see, too, our *Agrotis segetum*, Schiff., becomes *segetis*, Gmel. I am sorry to open up this matter, but it appears necessary that the publications of the Ent. Society of London should be as correct as possible.—J. W. Tutt, Westcombe Hill, S.E.

Origin of Dimorphism and Polymorphism.—One thing well borne out by the notes on "Dimorphism and Polymorphism in the Tortricidæ" you sent me, is the view that all *sexual* dimorphism arises primarily as simple dimorphism, and finally becomes representative of the sexes. I think the fact that in members of the same group some have the dimorphism common to both sexes, and some have it sexual, is in favour of this view. Of course it is *possible* to urge that the non-sexual dimorphism arose as sexual, and finally became inherited, and occurred in both sexes; but that I cannot believe, for, if so, how did polymorphism arise? Personally I do not attach so much value to the influence of food as some do. I think phytophagic varieties are quite rare. I do not easily see how the food-plant can directly and chemically affect the colour of an insect, though other things coincident with the food-plant (*e.g.*, temperature, dryness, etc.) may do so.—T. D. A. Cockerell, West Cliff, Colorado, U. S. A.

[I quite agree with Mr. Cockerell as to colour variation rarely, if ever, being due to phytophagic causes. My own impression is that variations due to such causes are almost always variations in size.—J. W. T.]

CURRENT NOTES.

Mr. C. G. Barrett sinks *Catoptria parvulana* as a small form of *C. scopoliana*.

A new species of *Nepticula* (*N. pyri*) has been added to the British fauna by Dr. Wood.

Dr. Chapman has succeeded in definitely differentiating the larvæ of *Glæa spadicea* and *G. vaccinii*.

The local *Aciptilia paludum* was taken near Lyndhurst (New Forest) last August. The Rev. O. P. Cambridge also records it from its old haunts at Bloxworth.

Mr. Blandford by breeding imagines of *Dianthœcia carpophaga* and *D. capsophila* from larvæ taken at Tenby, has again brought to the front the old suggestion that the latter is an extreme form of *carpophaga*. Mr. C. G. Barrett appears inclined to agree with him, but says, "the two forms are definitely to be distinguished." It must be remembered the specimens were bred from larvæ taken at large, with those of *D. conspersa* and *D. capsincola*, and not bred from ova.

Phycis subornatella and *P. adornatella* both come out of our lists, as Mr. C. G. Barrett proves them one species, and synonymous with Hübner's *dilutella.*

A new *Gelechia* (*portlandicella*) has been captured near Weymouth, and described by Mr. N. M. Richardson, who also describes a new *Nepticula* (*auromarginella*) from the same district.

The *Micropteryx* of the hazel (previously referred to *fastuosella*) has been named *Kaltenbachii* by Mr. Stainton.

A new *Retinia* (*margarotana,* H.S.) was discovered by Mr. C. G. Barrett in Mr. Hodgkinson's series of *R. pinivorana.*

The lepidopterists of the Entomological Society of London had a most unusual treat at the meeting held on February 5th, when Dr. Dixey read his paper on "The Phylogenetic significance of the wing markings in certain genera of the Nymphalidæ." As the paper is specially directed to our British fauna, and most of the species cited are British, all lepidopterists (who do not subscribe to the Entomological Society) should buy Part I. of the *Transactions,* 1890, to study the subject.

Dr. Chapman has worked out a most interesting and striking account of the economy and habits of *Hybocampa milhauseri* in his usual accurate and scientific manner. The description of the mode of exit from the cocoon is a marvellous example of Dr. Chapman's power of observation.

Hesperia lineola, the latest addition to the British Diurni, has been discovered in several cabinets doing duty for *H. thaumas* (*linea*).

Lithocolletis insignitella has just been described by Mr. Robson. It has been on our list thirty years without having been previously described.

VARIATION.

Black Varieties of Noctua glareosa.—Very dark varieties o this species have been frequently recorded from the Shetland Isles, bu on the 18th of August, 1887, while sugaring on Kinnoull Hill, near Perth, I took three black forms of *N. glareosa,* which I sent to Mr. Harwood, of Colchester, who said he had never seen anything like them before, During that particular season I took a great number of this species, varying from black to the normal type, with many intermediate forms, including rosy ones.—J. Wylie, Bridgend, Perth, N.B.

Varieties of Phigalia pilosaria.—Among the sixteen specimens of *P. pilosaria* captured on the 31st January, I took the *olive* variety, referred to by Mr. G. T. Porritt, and also one nearly as black as *Amphidasys betularia* var. *doubledayaria ;* the shades of colour are very many.—B. Blaydes Thompson, Harrogate.

Argynnis aglaia var. argentea.—I have a fine specimen of *A. aglaia,* captured here last year (1889) The ground colour is quite silvery ; it looks very beautiful.—W. Austin, Radnor Street, Folkestone.

VARIETIES OF GRAMMESIA TRIGRAMMICA.—This species is taken very commonly here. In 1887 it was a perfect pest at sugar. That year nearly all the specimens appeared to be of the normal type. In 1888 I took the species sparingly, but several var. *bilinea* and var. *semifusca* occurred. Last season, in common with all other lepidopderists, I found sugaring almost useless. I took only three specimens of *G. trigrammica* (*trilinea*), all three being var. *bilinea* and abnormally dark. In one specimen the third transverse line is just perceptible from the costa to rather above the middle of the wing.—(Miss) M. KIMBER, Newbury, Berks.

AT Clevedon (Somerset) we take three forms of *G. trigrammica* :— 1. Of deep wainscot brown colour (the common variety). 2. Ruddy in colour. 3. Deep grey, almost leaden; the latter form has not unfrequently only two transverse lines (*bilinea*), and is much less common. The first form also occurs in Carmarthenshire, but I cannot say whether the other two forms are found there.—T. B. JEFFERYS, New King Street, Bath.

LYCÆNA BELLARGUS (ADONIS) var. PALLIDA.—Although last season was such a bad one here for insects generally, I took a fine var. of *Adonis*. The upper side is of a pale lavender colour, and the under side has the usual rings, but no spots; the rings themselves are blind. — W. AUSTIN, Radnor Street, Folkestone.

VARIETIES OF ZYGÆNA TRIFOLII.—This species, which I take near here, in a locality called "Timberland," is very variable. The following are the chief points of variation:—

1. Upper central spot very small.
2. Two central spots joined.
3. All spots just in contact.
4. All spots forming one continuous band = var. *confluens*.
5. Base of hind wings orange = var. *semi-lutescens*.
6. All hind wings yellow = var. *lutescens*.

M. STANGER HIGGS, The Mill House, Upton St. Leonards, Gloucester.

XYLOPHASIA RUREA var. ARGENTEA.—"Anterior wings shiny silvery white, with faint traces of the typical costal streaks in pale brownish. The typical darker area on outer margin very faintly marked in pale, and the typical dark longitudinal basal marks brownish, no trace of orbicular, transverse lines or central shades, the reniform faintly outlined; hind wings grey, whiter at the anal angle."

This remarkable specimen of *rurea*, which appears to agree with the specimens mentioned in the *Entom.*, vol. xxii., p. 39, as captured in Scotland, by Mr. Salvage, was taken by Mr. K. Dingwall, who kindly gave it to me. Mr. Dingwall writes :—"The white specimen of *rurea* I took in a web in Scotland, at Ballachulish, in the Pass of Glencoe. When I took it, it was a perfect specimen, not rubbed, but very dry and brittle. I thought I had got something new, as it was in a shed under cover, and well protected from damp and weather; so I pinned it and put it by for identification. When I unpacked at Inverness the box was loose and the specimen somewhat injured; however, I set it, and the result is the specimen I am sending you. I cannot imagine whether the atmosphere or the turpentine emanating from the saw-mill where I took it had bleached it, or whether it is a natural variety. The weather could not have done it as it was so well protected" (*in litt.*).

The specimen is, I should say, without doubt, a perfectly natural variety, showing a great tendency towards almost perfect Albinism. At present the scales are but little injured, and it is such a variety as one might expect to find in this species, and its colour is undoubtedly due to the spread of the white colour found along the inner margin of the wing in typical specimens and the suppression of the dark markings. Surely some of our Scotch lepidopterists will soon tell us something more about such a striking form.—J. W. TUTT, Westcombe Hill, S.E.

VARIATION IN MIANA STRIGILIS.—I have taken numbers of this species at Handsworth, a suburb of Birmingham, and with one exception they have all been small and of the suffused variety. The one exception was large and beautifully marbled with white. Other lepidopterists round Birmingham have had slightly different experiencies, but all get the black form (*Æthiops*, Haw.) much more frequently.—C. J. WAINWRIGHT, Handsworth, Birmingham.

The dark brown melanic form (*latruncula*, Haw.) of *Miana strigilis* is not infrequent in the Clevedon (Somerset) district; but those specimens I have noticed have frequently been diminutive in size; the largest and most beautiful specimens being marbled with black and white markings. In Carmarthenshire (on the coast) I found, two years ago, a form[1] with a beautiful rosy tinge, the general colour of the upper wings being deep brownish, with beautiful rosy markings, especially noticeable by lamplight. This form was very frequent; in fact, I scarcely saw any other variety. These moths were not *M. literosa.*—T. B. JEFFERYS, New King Street, Bath.

AMERICAN VARIETIES OF BRITISH SPECIES.—As a matter of fact, American literature is far more difficult to get out here than in London, but so far I have come across notices of the following American forms:—

1. *Papilio machaon* var. *Aliaska*, Scud. Proc. Boston Soc. of N. H., 1869, p. 45 (Oregon, Alaska, etc.).
2. *Pieris napi* var. *bryoniæ*, Ochs. Alaska. (This you know as European of course).
3. *P. napi* var. *hulda*, Edw. A small dusky form allied to *bryoniæ*. Alaska. (See *Papilio*, vol. i. pl. 2, fig. 5.).
4. *P. napi* subsp. *venosa*, Scud. (summer forms = *pallida*, Scud. and *castoria*, Reak.).
    Subsp. *venosa* var. *flava*, Edw.
    „ *oleracea-hiemalis*, Harr.
        „ var. *borealis*, Grote.
        „ var. *frigida*, Scud.
        „ var. *virginiensis*, Edw.
        Summer form *acadica*, Edw.
        „ „ *oleracea-æstiva*, Harr.
    (These forms are fully and most interestingly dealt with by W. H. Edwards, in *Papilio*, vol. i., June 1881, pp. 83–99, and pls. 2 and 3).
5. *P. rapæ* var. *marginalis*, Scud., Proc. Boston Soc. N. H., 1861, p. 182.

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[1] Probably var. *ærata*, Esp.—J.W.T.

6. *P. rapæ* var. *yreka*, Reak., Proc. Acad. Nat. Sci. Philad., 1866, p. 32 (=*resedæ*, Bav., 1869).
7. *P. rapæ* var. *manni*, Mayer., *Stettin Entomologische Zeitung*, 1851, p. 151 (pale yellow).
8. *P. rapæ* var *novangliæ*, Scud., *Canadian Entom.*, 1872, p. 79 (dull sulphur yellow).

(These are quite a number of vars., considering that *P. rapæ* is an introduced species).

9. *Vanessa antiopa*, var. with the border less distinct than type [= var. *obscura*] near Rochester, in New York State. See Robert Bunker, *Canad. Entom.*, 1876, p. 240.
10. *V. antiopa* var. *lintnerii*, Fitch, 1856, pale border very wide, blue spots absent. This is the same as the European var. *hygiæa*, Hdrch., but I do not know which has priority. According to Dr. Lang (*Rhop. Eur.*) var. *hygiæa*, has been taken in Britain.
11. *Pyrameis Atalanta* × *carye* (hybrid between *Atalanta*, *L.* and *carye*, Hübn.), Hy. Edwards, Proc. Cal. Ac. N. Sci., 1876.
12. *P. cardui* var. *ate*, Strecker., *Syn. Catal. of Macro Lep.*, 1878, p. 137.
13. *Heliothis armigera* var. *umbrosus*, Grote. (Proc. Ent. Soc. Phil., 1862.) Primaries yellowish-grey, head and thorax yellowish-grey. This was described as *H. umbrosus* by A. R. Grote from a ♂, taken on Long Island, but he afterwards admitted its identity with *H. armigera*. It seems to be the greyish form of the species, well figured in 4th Rept. U.S. Entom. Commission (1885), pl. 3, fig. 8 (the type being fig. 7 on the same plate). Grote's original specimen lacked the discal mark on posterior wings.
14. *Plusia brassicæ*, Riley (2nd Rept. Ins. Missouri, pp. 111-112, fig. 81) appears to be a sub-species of *P. ni* of Europe, and the *Plusia ni* figured in *Entom. Annual*, 1870 (a British one) appears to be of the form *brassicæ*. Riley says :—"Staudinger would probably characterise *brassicæ* as a 'species Darwiniana';" *brassicæ* differs from the true *ni* in the silver spot and in "the darker and more irrorate colouring, and the interrupted and wavy terminal line of *brassicæ*, against the paler, smoother and more metallic colouring and the perfectly straight and unbroken terminal line of *ni*." *P. brassicæ* is destructive to cabbages in the Southern U.S.

These are all the American vars. of British species I can lay my hands on just now, but I shall doubtless meet with others in the course of my work, and will duly inform you of them.—T. D. A. COCKERELL, West Cliff, Custer Co., Colorado, U.S.A.

EUPITHECIA SATYRATA vars. CALLUNARIA and CURZONI.—In *Entomologist*, vols. xvii. and xviii. there was considerable discussion as to *curzoni* being a variety of *nanata* or a distinct species. Having some of the most strongly marked *curzoni* that were taken, I certainly believed that they formed a local race of *E. nanata*, while Herr A. Hoffmann, Dr. Staudinger, and others were of the same opinion. Mr. Gregson, however, considered the form distinct, but allied to *E. satyrata*, while Mr. J. B. Hodgkinson told us plainly that it was a northern form of *satyrata*. Mr. Gregson had one strong argument in his favour, and that was that the larva of *curzoni*, closely allied as it was to *satyrata* var. *callunaria*, had nothing in common with *nanata*. In the year or two following the first discovery and distribution of *curzoni*, the professionals who collected in the Shetlands did not take so much care in sorting their extreme forms, with the result that we were all soon supplied with intermediate forms leading down to var. *callunaria*, and there was no doubt that Mr. J. B. Hodgkinson had hit the right nail on the head when he insisted that "*curzoni* was only a northern form of *satyrata*;" in other words, that it was an extreme form of *satyrata* var. *callunaria*. As soon as I was satisfied of Mr. Hodgkinson's determination, I asked Mr. T. J. Henderson kindly to get me a fairly long series of var. *callunaria*, which he did from Garelochhead (some few miles from Glasgow). Being requested by Herr Hoffmann to get him var. *callunaria*, I again applied successfully to Mr. Henderson, and Herr Hoffman, on receiving them, wrote :—"They are of the greatest interest. I never thought it possible that such a difference in the size and shape of the wings could take place as between our *satyrata* and the Scotch *callunaria*; and moreover, it is curious that the larvæ of *satyrata* should feed on *Calluna vulgaris!* Staudinger, in his catalogue, gives another food-plant, but I suppose he is wrong. Certainly *curzoni* has some characters of *callunaria* (but also a good many of *nanata*). After all, I think the difference between *nanata* and *curzoni* is not as great as that between our typical *satyrata* and *curzoni*. At all events, this Shetland form is one of the most puzzling things I have ever met with" (*in litt.*). London lepidopterists seem to have gradually made up their minds that *curzoni* is a variety of *satyrata*, but the Rev. Joseph Greene, writing in the *Entom.*, vol. xxi., pp. 60–62, suggested that it was still considered a var. of *nanata*. As our provincial lepidopterists don't mix together as the metropolitan, and pick up less by word of mouth, it appeared advisable to write this note.

I may add that the typical continental *satyrata*, which feeds in flowers of *Scabiosa*, *Chrysanthemum*, etc. (like our South of England form) is much greyer and more distinctly marked than our own southern specimens, which are generally brown, with rather ill-defined markings.[1] Staudinger writes that var. *callunaria* feeds in *Eupatorium cannabinum* flowers, but adds a (?), as well he might.—J. W. TUTT. *March*, 1890.

NOTES ON COLLECTING, Etc.

NOTES ON AGROTIS LUNIGERA.—Having observed the comparative scarcity of this very interesting species of *Agrotis* in many otherwise representative collections, I can but conclude that a few practical remarks upon the habits and locality of the imago may be useful to many, especially to those working in the south of England.

As is well known, the Isle of Wight is the head quarters of this insect, but it is far more widely distributed along our south-western coast than is generally supposed; the absence of records being in my opinion due in great measure to the fact that, except where, as at

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[1] This is nearly always the case. Our Southern British specimens are in almost all species suffused compared with Central European specimens.—J.W.T.

Portland, its localities are specially worked for other species, its favourite haunts are in great measure neglected by our collectors.

In a westerly direction from Portland, I have taken it sparingly upon Beer Cliff, near Seaton, whence its range is again extended to Torquay, where it was taken in some plenty, years ago, by Henry Rogers of Freshwater, Isle of Wight, one of our old collectors, who, in conjunction with the late Frederick Bond, was one of the first to make a practical acquaintance with this species. Further west again, it extends into Cornwall, and is also taken in some numbers in Ireland, while in a more northerly direction it was taken at Tenby in 1888. It is also stated to have been reported from Flintshire and Scotland, but no further particulars are given as to these localities.

It is in all these localities exclusively a coast species, and its range inland is more limited than is usual with coast insects; in fact so much so, that unless worked for almost along the actual sea-line, it may be, and probably is, often overlooked. The following few remarks from my own experience refer chiefly to the western end of the Isle of Wight, whence, except for the Irish specimens, most of those in our collections have been obtained.

The collector who wishes to take a long series, in which he will be amply repaid by the variation to be met with, must be sound of wind and limb, and may at the end of the season, which in favourable circumstances will last nearly a month, consider himself as fairly qualified for membership with the Alpine Club. The cliffs, upon which I have been most successful, vary in height from 400 feet to 600 feet, and present much broken ground which entails considerable difficulty in working, especially after dark.

A novice, particularly if accustomed to inland or forest collecting, would be much puzzled as to the best methods of sugaring (which is the most productive way to obtain this insect); however, a closer examination will discover plenty of suitable plants upon which to sugar.

Of these, the best in my experience, is a sturdy species of thistle (*Onopordum acanthium*) which grows in isolated spots along the whole range of cliffs; but where this does not occur, the dwarf or stemless thistle (*Carduus acaulis*) will serve as a substitute. I have also found the long upright spikes of the common beet (*Beta vulgaris*) very attractive when sugared, but the great objection to these is that they are so easily swayed by the slightest breeze, thereby considerably adding to the difficulty of "boxing" the desired insects. While on this subject, I may add that it is preferable to have a smaller and less open lantern than the pattern ordinarily used in sugaring, as it is a matter of great difficulty to keep the latter alight if at all windy, owing to the elevation and exposed nature of the ground.

It is also well, considering the dangerous nature of the locality and the absence of landmarks, to prospect the ground during the day, and in selecting the plants for sugaring, it must be borne in mind that it is only those on or quite adjacent to the extreme edge of the cliffs, that will prove really prolific; and with regard to this fact, I think it is only those of steady nerves, who, after prospecting the ground with that fact in view, will still consider *lunigera* to be worth working for.[1]

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[1] Mr. Hodges is right. He took me over his sugaring ground on the night of July 24th, 1889. He could not persuade me to go again. Those who get *lunigera* deserve it.—J.W.T.

During the summer of 1888 I was fortunate enough to take a very long series of this species, and of the total number, certainly four-fifths were taken within ten feet of the edge of the cliffs. It is also to be noticed that those thistles growing upon the open turf are not nearly so attractive as those growing amongst the loose chalk rubble in the crevices and upon the face of some of the seaward slopes. This confirms the idea that *lunigera* by day rests amongst the loose chalk upon these slopes, and in the crevices which abound along its favourite haunts. At the same time, it adds very considerably to the danger and difficulty of its capture, as it often occurs that the adventurous collector may hear, in the stillness of night, the rattle of the loose chalk dislodged by his footsteps, dashing from rock to rock, until drowned by the roar of the waves 500 feet beneath. This, in my opinion, enhances the pleasure and excitement of the pursuit, but upon this point I am told my views are peculiarly my own. At the same time, it is an undoubted fact that the thistles growing in these spots are by far the most remunerative to work, and I have a vivid recollection of my pleasure in taking between twenty and thirty fine *lunigera*, one by one, off a single isolated thistle in such a position; this was, however, during an exceptionally good season, when all the AGROTIDÆ occurred in unusual plenty.

Those collectors of a more cautious disposition will find, if thoroughly worked, that the commoner thistle (*Carduus acanthoides*), the knapweed (*Centaurea nigra*), and even the cow parsnep (*Heracleum sphondylium*), which are to be found in more accessible situations along the inland foot of the Downs, will yield a few stray specimens especially in a favourable season.

A. lunigera varies considerably in common with the other AGROTIDÆ, in the time of its emergence. I have found it as early as the first week in July, and have also known it not to appear till quite the middle of that month; and then a succession of emergences continues until August, during which month I have taken them in good condition until the 15th; the males emerging rather earlier than the females.

With regard to "light," there is no doubt that were the locality suitable for that method of collecting, *lunigera* could be taken in that way; but owing to the great elevation, any light, however small, is very conspicuous, and at once draws down upon the collector a visit from the coastguards, of whom, however, my impressions are much more favourable than of the average game-keeper. Their regulations, however, will not admit of the use on the cliffs of any light sufficiently powerful to be of much use.

It is supposed by some that our *A. lunigera* is but a variety of the Continental species *A. trux*,[1] but I trust the further investigation that may be brought to bear upon the subject, should these few notes enable collectors to become better acquainted with this species, may confirm the position that *A. lunigera* occupies in our British lists.

ALBERT J. HODGES, 2, Highbury Place, N.

"ASSEMBLING" AMPHIDASYS PRODROMARIA.—Having been fortunate enough some two or three years ago, to capture a ♀ *prodromaria* at rest on a tree trunk (about 5 feet from the ground) in a wood near here,

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[1] This point is quite unsettled still, owing, probably, to the few British specimens which have found their way into the best Continental collections.—J.W.T.

I thought I would try what success I could meet with by using her for the purpose of attracting males of the same species. Towards dusk I placed the ♀ in a large muslin bag and hung it in a slightly sheltered position in the wood, as the wind was rather high; but I was evidently too early, as nothing came until an hour or so after dark, when all at once I noticed an insect crawling over the muslin; being a great deal too eager to net it, I must have knocked it down, as it disappeared and not seeing any more for half an hour or so, I removed the bag and when I was some distance away, found either the former or a second male fluttering round it, and this time I netted it. I again hung the bag up on the outskirts of the wood, and succeeded in taking another male about 11.30 p.m. I paired the ♀ the same night; they were *in cop.* for 17 hours, the ♀ laid a quantity of ova, some of which I reared and used the females the following season for the same purpose. The result of my experience is that it is best to enclose the ♀ in a small muslin bag (about 3 inches in diameter), as it or several are then more easily carried; I generally sit down close under the tree and by looking up at the bag against the sky, the insects attracted can easily be seen on the white muslin. I have found the best time to be between 10 and 12 p.m.; sometimes there are three or four round the bag at once, they seem to come from above as if out of the branches overhead. At first I lost several through being too hasty, as they will frequently dart off, but if allowed to settle on the bag and crawl round a few times, there is then not the slightest trouble to take them either with a bottle or a chip box; they will even crawl over the hand in their endeavour to reach the ♀. I have seldom found the same ♀ of much use the second night, although I have captured an odd male occasionally. One slightly windy night I attracted a good number of males, and took the same ♀ out the following evening, which was quite mild and warm contrasted with the previous one. I waited by the bag fully two hours without any result; unfortunately I had not a second fresh ♀ at the time, or it might have shown if the wind was of any assistance, I also found, if placed together the same night, that the males and females paired readily and the eggs proved fertile, whereas those I retained until the following night seemed sluggish and little disposed to copulate. Some did so, but with me the ova have proved infertile, which seems to show that their attractive powers are most effective the first day. The majority of those I have bred emerged from the pupæ between 8 and 10 a.m., very rarely later. After drying their wings they settle down quietly, but towards dusk, crawl up to a point where they can let their bodies hang suitably for attraction. I have taken a good many males at light but seldom met with any earlier than 10 p.m., so am of opinion that the best time both for captures at light and assembling is from 10 to 12 p.m.—HOPE ALDERSON, Farnboro', Kent, R.S.O.

ERRATIC APPEARANCE OF AGROTIS SEGETUM AND A. SUFFUSA.—In 1887 *Agrotis segetum* was in great abundance near here, in fact they were a perfect pest, while I did not see a single specimen of *A. suffusa.* Last season (1889) *suffusa* abounded, while I did not see a single specimen of *segetum*, although I sugared the same place every other night.—J. WYLIE, Bridgend, Perth, N.B.

EARLY SPRING MOTHS.—On Friday, January 31st (1890), I went out to take some *Hybernia progemmaria*, a very variable species here, and when I had just *filled my boxes*, I came upon *Phigalia pilosaria* on the wing in scores, all flying round a dwarf holly bush in a hedge. I had a man with a lamp with me, and fortunately we had a net each. I had to resort to my pocket killing bottle, and my man caught them until my bottle was full, and we then had to give up. They swarmed round the holly bush, but we could not beat any out. They ceased for about five minutes, and then came again as thick as ever. I concluded there were females about, but the most vigorous search failed to find any trace. When I reached the inn and turned out my killing bottle, there were 16 *P. pilosaria*, all freshly emerged specimens, which were very variable. The result of my outing was 16 *P. pilosaria*, 13 *H. progemmaria*, 27 *H. rupicapraria*, 2 *Cheimatobia brumata*, and 2 *Depressariæ* (*sp ?*). I do not consider this bad for the 31st of January! The night was still, warm, and bright moonlight.—B. Blaydes Thompson, Harrogate.

American Foodplants of British Insects.—To those interested in the *food plants* of British insects, the following may be of some service:—

Amphipyra tragopogonis, L. is recorded as feeding on the vine, by Strecker.

Heliothis armigera, Hübn. is recorded as feeding on the cantaleup and cotton plant, by Strecker.

Noctua C. nigrum, L. is recorded as feeding on the maple, by Thomas, and on the peartree, by Harrington.—T. D. A. Cockerell, West Cliff, Colorado, U.S.A.

Species double-brooded in 1889.—The fine weather in May and June brought out the spring moths earlier than usual, and as a consequence of continued fine weather for several weeks, many early species produced a second brood remarkably early in the season, and ordinarily single-brooded species have had a partial second brood. The second brood (I presume this was so) of *Cidaria silaceata* was getting worn near Yarmouth (I. of W.) at the end of July and beginning of August, as also was that of *Ephyra porata*. On the 31st of August, I found near Strood in Kent, fine specimens of *Metrocampa margaritata* quite recently emerged. The second brood of *Platyptilia gonodactyla* was out in the middle of August, and continued to emerge up to the end of September. Of *Melanippe galiata* I took the second brood during the last two days of July at Freshwater, and *Aspilates citraria* began to appear about the same time. A second brood of *Eubolia lineolata* was out at Deal on the 6th of July.—J. W. Tutt, Westcombe Hill, S.E.

Eupithecia togata two years in pupa.—I have just bred the remainder of a lot of pupæ of *E. togata* sent me in 1888. The greater number came out during last April (1889). It is strange how many Scotch pupæ go over for two years before emergence. I have previously had Scotch pupæ of *Saturnia carpini*, *Eupithecia venosata*, *Emmelesia albulata* and *Heydenia auromaculata* do so. This is the more remarkable, as one would expect the higher temperature to which they are subjected in the south would hasten their emergence, and it suggests at once that many pupæ in Scotland must normally pass two years in the pupal stage. Last year these pupæ were subjected to the same heat as I applied to bring out *Deilephila galii* in January. I would suggest that Scotch lepidopterists should be particularly careful not to throw away pupæ which do not emerge the first year at the normal time.—J. W. TUTT. *March*, 1890.

DOUBLE-BROODEDNESS OF ACIDALIA EMUTARIA.—It may not be generally known that the above very local *Acidalia* is double-brooded, and as the bad nature of the ground frequented by the species is certainly not an incentive to its being systematically worked, it probably accounts for the fact not being more generally known. In the Isle of Wight, where I have met with this pretty little "Wave" in considerable numbers, I have found it on the wing about the middle of June, continuing until the end of the first week in July, after which date but occasional single specimens are seen, and these but for a few days longer. After an interval of fully a month from the appearance of the last stragglers of the first brood, the second brood commences to appear, and may be taken until quite the end of August. I have noticed that the early brood produce as a rule much finer specimens than those appearing in August. It is also remarkable how very difficult this species is to beat out, even where known to be abundant, during the day time when the swampy nature of its favourite localities permits such an invasion of its haunts.[1]—ALBERT J. HODGES, 2, Highbury Place, N.

EUPERIA FULVAGO AT SHEFFIELD.—I had the pleasure last year of taking a few specimens of this local species, in a very small wood quite close to this town. They were not at all plentiful, but much darker than those from either Sherwood Forest or the neighbourhood of Doncaster. I am very glad, in conjunction with Mr. Batty of this town, to add this species to our Sheffield list.—A. E. HALL, Norbury, Pitsmoor, Sheffield. *March*, 1890.

PŒCILIOCAMPA POPULI AT LIGHT.—Everyone knows how fond this species is of the gas lamps. In a walk round to the lamps in the suburbs of this town on a warm night about the middle of November, one sees it dashing madly against the glass in its endeavours to get inside the lamp; endeavours which are too often successful, since the trap door used for the purpose of lighting the lamp is generally left open, or if it happens to be shut the chances are the glass is broken somewhere and the moth gets in. When inside, of course it never rests till it has been through the light. If the moth cannot get inside, it rests not on the glass, but on the dark supports or framework of the lamp, where its capture is easy; and in this case it is almost invariably a good specimen. But three out of every four get inside, and ruin themselves. Last November, after an unsatisfactory visit to the street lamps, I thought I would see what another plan would do. I tried two large lamps about 10 feet from the ground, and at the same distance apart, placed in front of a large dark sheet hung up about 15 feet from the lamps. I selected a dark sheet because the moths prefer a dark surface to rest upon. I visited the sheet several times during the evening, and the result was I boxed 20 *P. populi* and 3 *Sphinx cassinea* in perfect condition the first night, all quietly at rest on the sheet. After this no more two hours' march round the gas lamps for scorched specimens!—W. HOLLAND, 111, Southampton Street, Reading. *March 8th*, 1890.

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[1] I have taken both broods repeatedly at Deal.—J.W.T.

NOTES FROM SUFFOLK.—During last July I spent a fortnight at Aldeburgh, and although not much regular collecting was done, I casually came across a number of species. Larvæ of *Leucoma salicis* and *Dicranura vinula* were very common on their usual foodplants; apparently *Trochilium apiformis* and *T. crabroniformis* occur abundantly, for I found a fine female of the former on a tree trunk, and a large number of empty pupa cases sticking out of the roots of poplar trees, imagines of the latter species were here and there picked up in the neighbourhood of sallows. *Melanippe unangulata*, *Emmelesia decolorata*, and *Rivula sericealis* were of general occurrence; the insect that occurred in the greatest numbers was *Eupithecia pumilata*. This simply swarmed on the trunks of trees, in the neighbourhood of the furze-clad common, which stretch inland. I counted over 20 specimens on one trunk, they were of course the second brood, and were a very fine form, some of the females looking like small *E. togata*. Perhaps the most unexpected catch was *Acidalia emutaria*, which was flying in small numbers over some marshy ditches; they were, however, worn to shreds Specimens of *Myelophila cribrum* occurred amongst thistles, on which also the larvæ of *Vanessa cardui* were common. *Bryophila perla* was plentiful on walls, but no varieties worth speaking of occurred. Sugar, and also the heads of marram grass were very unproductive; the only insect other than the commonest, that I took, was a very melanic specimen of *Hadena dissimilis*. I could hear of several larvæ of *Acherontia atropos* being destroyed by potato diggers, and after my return home had two sent me. Of course I made a special search for *Sphinx pinastri*, but without success.—W. G. SHELDON, 15, Alexandra Road, Croydon. *March 12th*, 1890.

ENTOMOLOGY IN SUFFOLK, 1889.—From the 3rd to the 15th of August I was collecting at Brantham a village on the southern border of Suffolk, about midway between Colchester and Ipswich, and immediately opposite on the other side of the estuary of the Stour, to the town of Manningtree. The place is on an old river bank, and the geological formation, London Clay, overlaid by a cap of sand and gravel. There are no woods in the immediate vicinity, and the locality is almost entirely agricultural.

The weather was fitful and uncertain, and not favourable to the successful pursuit of butterflies of which 17 kinds were captured, including *Colias edusa*, 5 specimens, all taken in one field—none seen elsewhere; *Vanessa polychloros*, a single specimen; *Pararge megæra*, very abundant and in fine condition. Of BOMBYCES, 3 species only were seen, viz.: *Lithosia lurideola*, *Lasiocampa quercifolia* and *Cilix glaucata*, all taken at dusk. Of NOCTUÆ 30 species were obtained, mostly at sugar on the evenings of the 3rd, 7th and 13th. The most notable were: *Acronycta rumicis*, 8 specimens in very fine condition; *Leucania comma* and *Calamia phragmitidis*, flying among reeds at dusk; *Hydræcia nictitans* both the dark and pale forms (*paludis*), but all with orange reniform; *Mamestra abjecta*, 3 specimens; *Apamea didyma*, a perfect pest and in endless variety; *Agrotis puta*, 1 specimen; *A. tritici*, 2 specimens of the ordinary type, and 1 of the pale form labelled as

A. aquilina in our lists; *Noctua plecta*, 2 specimens; *N. rubi*, very abundant; *Triphæna janthina; T. comes*, several varieties (one very dark), all having the reniform of a reddish colour; *Amphipyra pyramidea*, abundant and in fine condition; *A. tragopogonis* and *Mania maura*, very abundant; *Tethea subtusa*, 1 specimen caught at dusk; *Hadena trifolii; H. dissimilis* (*suasa*), 1 worn specimen; *Gonoptera libatrix*; *Habrostola tripartita*, 1 specimen at dusk, flying over nettles; *Catocala nupta*, fairly common. Of GEOMETERS, 21 species were taken, mostly common ones. The following alone seem worthy of record: *Acidalia imitaria; A. emarginata; Ligdia adustata; Emmelesia alchemillata; Eupithecia subfulvata*, and *Cidaria picata*.

The locality sugared was the circumference of an old duck-decoy pond, surrounded by trees of several kinds and with a plentiful undergrowth of shrubs. The evening of the 3rd was the most prolific, and was an illustration of the success of sugar after heavy rain.—FRANCIS JOHN BUCKELL, M.B., 32, Canonbury Square, N.

NOTES ON THE EARLY SEASON.—This year everything hereabouts is unusually forward. Among lepidoptera, *Phigalia pilosaria* has been out in our woods all the year, and a few were observed at rest on December 26th of last year; I have been breeding it freely all the year. *Anisopteryx æscularia* first appeared in my cages on January 26th and freely since, *Hybernia progemmaria* on January 28th, and *Cymatophora flavicornis* on March 9th, though my friend, Mr. J. Batty of this town, bred one three weeks previously. *P. rapæ* has been emerging freely all the year, and the first *Nyssia hispidaria*—a female—emerged on March 9th. *Tephrosia crepuscularia*, a male, came out on March 9th, and a female *Tæniocampa rubricosa* to-day, the 11th inst. I may here state all my breedings are conducted in a house of exactly the same temperature as out of doors. I was out in a wood near here to-day, but did not see or take anything worthy of notice. It was so warm, one could have fancied it was May if the trees had only been in foliage. *Tortricodes hyemana* was literally flying in hundreds everywhere when the sun was shining, but directly it disappeared behind a cloud, they all settled on the herbage, and not one was to be seen. *C. flavicornis* was at rest, but not at all commonly.—A. E. HALL, Norbury, Pitsmoor, Sheffield. *March 11th*, 1890.

ABUNDANCE OF HYBERNIA LEUCOPHÆARIA AND OTHER SPRING MOTHS.—Perhaps some of your readers' experience may be identical with my own, regarding the abundance of *Hybernia leucophæaria* this year. I took it here as early as January 16th on a park fence, and in considerable numbers, taking about 40 that day, and over 200 ♂ and 1 ♀ in the course of a week. There was then a slight lull regarding numbers, the weather perhaps accounting for this, but I took it freshly emerged up to March 6th. Some of them were very good varieties, especially among the dark-banded ones, which occurred at the rate of about 20 per cent.; a peculiar point being the later the emergence the darker the variety, and the number of dark ones seemed to increase in proportion, the later I found them. I have not had much experience with this moth hitherto, as last year after very careful search (on tree trunks not fences) for about 6 weeks, I only took 1 ♂ on the 19th of March, and the year before about 30 in the same place, which abounded in very old oaks and elms, so was of course very surprised and pleased to see them in such numbers this spring. Does this mean that we are to have a plentiful year for insect life, or an early spring? *Phigalia pilosaria* was also earlier than usual, though not nearly as common as *leucophæaria*. I took my first on December 30th, 1889, though last year they were still earlier, my first being taken on the 4th December, 1888, which I suppose is abnormally early. This species I find varies slightly; some being quite pale (green), while others are dark with nearly black markings, the latter being much harder to see on the weather-beaten fences. I have not troubled to look for them on the oak trees in the Park, otherwise I should no doubt have found some ♀♀, all my captures in both species being ♂♂ with the exception of one specimen. *Progemmaria* I took as early as February 1st, though I have never taken it previously before March, and took it last year in good condition as late as April 5th. The time of emergence of *leucophæaria* seems to be about 11 a.m., as I found a great many drying their wings about that time. Can anyone inform me how the female should be captured?—R. B. ROBERTSON, Calcot, Reading.

SPHINX LIGUSTRI IN PUPA TWO YEARS.—Mr. Tugwell, in the *Young Naturalist* for March, in an article on the probable origin of *Deilephila galii*, says:—"I have had some species two or three years in pupa, as *Petasia nubeculosa*, etc., but I never had a Hawk moth lie over, and I think it is most unusual for them to do so." In 1887, I had about 14 larvæ of *S. ligustri* which pupated satisfactorily in 1888; 8 of these came out at the usual time, and in clearing my breeding cages I threw the remaining 6 pupæ, which seemed quite stiff and dead, out to be thrown away; but instead they were put with some other rubbish into an outhouse, where to my astonishment they emerged in June, 1889, and splendid specimens they were. All 14 were in the same box from the time of pupation until some time after the emergence of the first batch in 1887, so that they all had the same conditions of heat, damp, etc., and why some came out in 1887 and some in 1888, remains a puzzle which I cannot solve.—T. BAXTER, St. Anne's-on-the-Sea, Lancashire.

PRACTICAL HINTS.

(*a*) During summer look in reed-beds for reeds in which the *central* leaves are yellow and appear dead. Cut such close to the water, and place reeds in a jug of water. Several species, including *Leucania obsoleta*, *Nonagria geminipuncta*, etc., will be found.

(*b*) During August look in beds of the Great Reed Mace (*Typha latifolia*) for plants which have the central leaves yellow and dead. Cut low down as possible, and place in water. *Nonagria arundinis* (*typhæ*) will be bred.

(*c*) In May look on small birch trees and examine suspicious-looking catkins. Some of the catkins (?) will probably be larvæ of *Geometra papilionaria*.

(*d*) When the birch leaves are well out, search for rolled-up leaves Many will contain larvæ of *Asphalia flavicornis*.

(*e*) During the first week of June, beat low elm trees on the outskirts of woods, or on the borders of rides in woods. Large numbers of larvæ of *Thecla w-album* may thus be obtained. *Petasia cassinea* and *Cosmia affinis* are also generally obtained in some numbers at the same time and in the same situation.

(*f*) In April fill a large bag with catkins of the common birch, keep bag tightly tied up for a week or two, and then turn into a large close-fitting bandbox. Many of the birch-feeding species may thus be obtained.

(*g*) In April fill a large bag with catkins of ordinary sallow. Treat as above. Many NOCTUÆ (*Xanthias*, etc.) and TORTRICES will be bred.

(*h*) Collect heads of coltsfoot (*Tussilago farfara*) during May. Place in large bandbox. You will probably breed large numbers of *Platyptilia gonodactyla*.

(*i*) On small oak-bushes during June look for large bunches of leaves joined together, with some of the leaves whitened and eaten. Place in band-box. You will breed *Rhodophœa consociella*.

(*j*) During the latter half of June and first week of July, look out for any tall thistles (especially *Carduus palustris*), which show, by the drooping and sickly flowerheads, the effects of the internal ravages of a larva. Cut about the end of June, and the pupa of *Gortyna ochracea* (*flavago*) will be obtained.

NOTICES.

"MONOGRAPH OF THE VARIETIES OF BRITISH NOCTUÆ."—Owing to the greater number of subscribers to the above work suggesting that a larger subscription should be charged, and that the work should be illustrated, I offered the work to a well-known firm of West End Publishers, and they have expressed their willingness to take it and illustrate it with chromo-lithograph plates. This will, however, delay its production and raise the subscription price. Mos of the subscribers themselves suggested doubling the proposed price, and the Publishers suggest the same arrangement. This would make the vols. 10s. (or thereabouts) each. If any subscriber does not wish to increase his subscription, I will arrange to send the letterpress without plates as per my circular. I shall be pleased to increase the list of subscribers, which already includes many of the leading British, European, and American lepidopterists.—J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E.

The Entomologist's Record

AND

JOURNAL OF VARIATION.

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NEUROPTERA AND TRICHOPTERA.

By J. W. TUTT, F.E.S.

There are two groups of insects which I should like to see worked up by our Entomologists, viz.:—Trichoptera and Neuroptera. These two groups can very readily be worked by lepidopterists, since they are captured by the same means, have somewhat similar habits, and are set in the same way. At the same time they consist of so comparatively few species that they would give but little additional trouble to the lepidopterist in his usual work. The Neuroptera (dragon flies, lacewing flies, stone flies, etc.), only number some 200 British species, and many of them are very common. Their beauty causes us to occasionally capture them for inspection, but lepidopterists rarely go further. If they knew how few species there really are, I think they would be more ready to work them up. I was quite astonished myself when my friend Mr. Porritt urged me to collect them ; I had a vague idea that each group represented a similar amount of work to that required to collect lepidoptera properly, and was much astonished to find how small a number of species there were. The Trichoptera (caddis flies, etc.) are well known to all British lepidopterists. In damp woods we beat them out of bushes, etc., when after lepidoptera, and in marshy localities many of them come freely to the sugar we spread for Noctuæ. The group itself is not rich in its number of species, only about 160 British species being known, so that they would require but little extra work.

Mr. Porritt will give any help that is needed in the naming of species not readily made out, and will be thankful for specimens (with data) taken by lepidopterists, who will go no further in the work. It seems a shame to waste material which could be made of so much use by those who are scientifically working up the group, and I trust that those who find insects of these orders will set at least types and get them identified.

Mr. McLachlan's *Trichoptera of the European Fauna* is by far the best book on the Trichoptera; but those who do not care to go to the expense of the work will be able to study fairly from the same author's *Trichoptera Britannica*, published in the *Transactions of the Entomological Society of London*, in Part I., October, 1865, and Part II., July, 1868, respectively. Dr. Hagen's papers in the *Entomologist's Annual*, from 1857 to 1861 will be found most useful.

THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(Continued from page 4.)

THE three divisions into which the genus *Acronycta* thus naturally falls do not, so far as I can find, precisely agree with any sub-genera that have been proposed. *Semaphora*, Gn., for the *psi* group is the nearest, but this genus did not include the whole group, and that Guenée did not fully understand the inter-relation of the species, having chiefly studied the imago, is clear from his placing *alni* and *ligustri* in the same group. I feel constrained, therefore, very unwillingly, to provide names for these groups; and since the pupa most distinctly classifies them, I take the character of the pupa on which to frame the designation.

The first, or *rumicis* group, which is the most typically *Acronycta*, I call *Viminia* (*Vimen*, a barrel hoop formed of a split willow branch), from the hoop-like raised margin of the segments of the pupa, which is present more or less in all, and very marked in some species (*vide* Plate I., fig. 1).

This group is characterised by the eggs being laid in groups, usually in a very regular manner, imbricated, that is, in regular rows overlapping each other, an arrangement which their flatness permits, and which is precisely the same as in certain PYRALIDÆ, but does not occur elsewhere, so far as I know, among the NOCTUÆ, the form of the egg rendering it indeed impossible, though the typical NOCTUA group of eggs is laid in the same order, but being spherical (more or less) are side by side instead of overlapping.

The young larva is of typical *Acronycta* form and colour, in all the five British species being very nearly alike, and very close to the newly-hatched larvæ of *psi* and *tridens*, having the 2., 3.4, 6.7, 10.11, and 13th segments pale, differing from the other groups in having three or more hairs on the anterior trapezoidal tubercles. The full-grown larva tends to be hairy by having many hairs on the tubercles, the rest of the larva being comparatively free; *auricoma* and *menyanthidis* are typical in this respect.

The pupa is (with the disposition of the eggs) the most distinctive character of the group. It is black or nearly so, of a rough, wrinkled, and warty surface; the free abdominal segments (segments 9 and 10) are of as wide, or even wider a diameter than those in front of them, the tapering to the tail being done in the remaining fixed segments 11–14, giving a peculiar squareness to the pupa. There is a double nodule between the eyes; the posterior margin of each segment, most marked in 9 and 10, has a raised band, just like those barrel hoops that are made of a branch split and with the bark left on, whose smooth surface contrasts with the roughness of the rest of the segment. In many pupæ (NOCTUÆ and others) there is a tendency for this margin of the segment to be free from pits or points, and in some a slight tendency to be raised above the general level, but nowhere else does it assume so distinct a barrel hoop form as in *rumicis* and *venosa*. The anal armature is a projection with somewhat quadrangular termination having the points or spines nearly or quite obsolete, but clothed with a brush of stiff brown bristles (Plate I., fig. 1, pupa of *rumicis*).

This pupa is enclosed in a cocoon of tough, whitish silk, fairly copious in amount, but of one simple layer, usually clothed in fragments of grass, twigs, leaves, etc., and often placed against a stump, stone, or post.

The second, or *psi* group, I propose to call by the name *Cuspidia* (*cuspis*, a spine), as the pupæ are distinguished by a peculiar arrangement of long terminal spines (*vide* Plate I., fig. 2). In this section the eggs are always laid separately and, so far as I know, in the wild state, are laid solitarily. They are not quite so flat as those of *Viminia*. Being laid solitarily, they assume their natural dome shape, whilst those of *Viminia* being laid overlapping each other, and consequently not on a flat surface, take whilst soft a form in which some of the convexity affects the lower surface and are therefore flatter above; essentially probably the eggs in both groups are equally dome shaped;

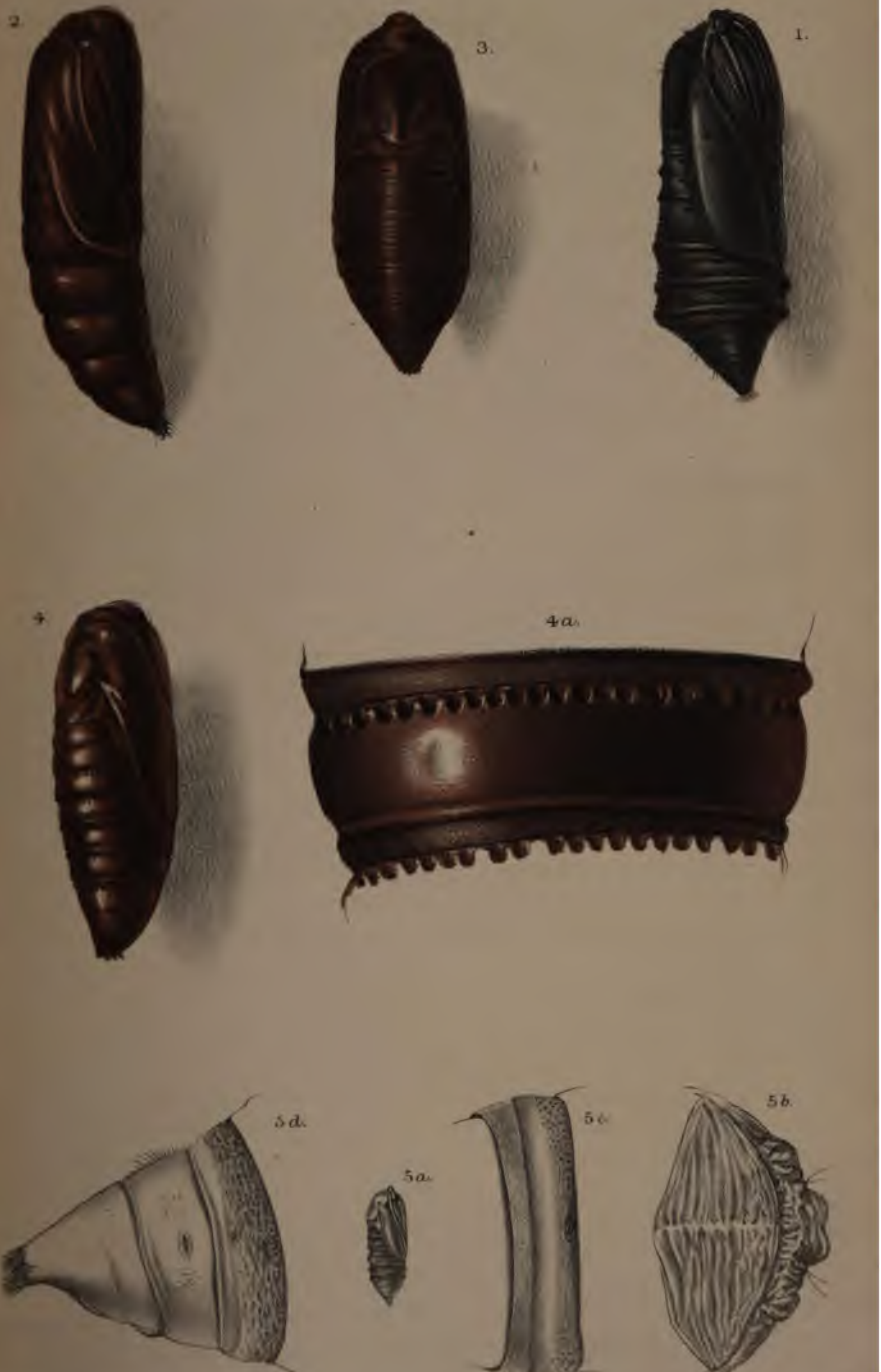
indeed this is clearly apparent when an egg or two in *Viminia* is laid solitarily, as happens occasionally in all species, perhaps most frequently in *myricæ*.

The newly-hatched larvæ in *Cuspidia* always have the eleventh segment pale, but the tints of the other segments differ in different species; in *psi* and *tridens* they are the same as in *Viminia*. In nearly all species the *anterior* trapezoidal tubercles have only one bristle, but two occur in one or two species. The full-grown larva is in each species a law to itself, but where the larva is hairy, as in *leporina* and *aceris*, the hairs arise chiefly from the general surface, and the tubercles, as bases for bundles of hairs are not easily distinguished, whilst in the non-hairy species, such as *alni*, each tubercle has one bristle.

The pupa, however, is again the most distinctive stage of the group; it is indeed hard to believe that there can be any relationship between, say, *rumicis* and *psi*(cf. Plate I., figs. 1 and 2); the latter is of the ordinary NOCTUA, smooth, brown, brittle-looking, semi-transparent, chitinous material; it tapers regularly from the thickest part of the thorax to the terminal segments, which are somewhat rounded to finish with, and the sculpturing, instead of being raised points, consists of the ordinary minute pits (Plate I., fig. 2, pupa of *tridens*). The anal armature consists of a system of spines, of which there are a dorsal and a ventral series. I presume strictly, all are dorsal as being dorsal to the cloacal aperture, but in relation to each other, these groups may be most simply so described. The dorsal set consists of two spines, one on either side, but not far from the middle line; only in *aceris* do these tend to be multiplied, apparently by being split up rather than by others being developed. The ventral set is more variable, and consists of three or more spines on either side. These pupæ are not contained in a silken cocoon, but in cavities formed by the larvæ in rotten wood, bark, etc. Some, as *psi* and *tridens* use rather more silk, and will spin up in *débris* or even go down into earth, if no other resource is available, whilst *aceris*, though loving some dead loose bark or such material, spins an elaborate cocoon almost anywhere; in this respect, and in the anal armature, perhaps, presenting a slight approach towards (or from) the *Viminia* group, and the further gap may, for aught I know, be bridged over by some exotic species.

The third group I propose to name *Bisulcia* (*bis* twice, *sulcus* a furrow) from the double depression that crosses the back of

Pl. I.



Horace Knight ad nat. del.

West, Newman lith.

Pupæ of Genus Acronycta.

each segment of the pupa (Plate I., fig. 3, pupa of *ligustri*). Having only one species in the group it is difficult to say what characters are generic and what specific. The egg is laid solitarily, and is indeed very like that of *psi*; the young larva is pale throughout, with only one bristle on each tubercle. The full-grown larva does not at all suggest *Acronycta*, being green and semi-transparent, and tapering regularly to each extremity.

The pupa is thick and squat, and has two transverse depressions on the dorsum of each segment; the anal armature consists of short points. The cocoon is of a hard, tough, but somewhat brittle silk, nearly black in colour, and with always some indication of an opening at one end, and sometimes an almost distinct line of division forming a valve for the emergence of the moth.

The perfect insect in *Bisulcia* has a tufted abdomen, and is more polished in wing surface, and the wings are shorter and rounder, so that altogether the moth has a different facies from the other species; but between the other two groups there is no very decided difference. *Viminia* is more robust, and has a rougher aspect than *Cuspidia*, but so indefinite is the distinction that, judging from the imago alone, there would be some temptation to class *megacephala* with *Viminia* and *menyanthidis* with *Cuspidia*.

The other pupa in Plate I., that of *orion* (fig. 4), differs considerably from any of the true *Acronyctas*, but not more so than the several sub-genera do from each other. It will be best to deal with it when treating of that species.

(To be continued.)

EXPLANATION OF PLATE I.

Enlarged about 3½ diameters.	Fig. 1.—Pupa of *Viminia rumicis*.
	Fig. 2.—Pupa of *Cuspidia tridens*.
	Fig. 3.—Pupa of *Bisulcia ligustri*.
	Fig. 4.—Pupa of *Moma (Diphthera) orion*.
	Fig. 4a.—Pupa of *M. orion*, 9th segment, enlarged about 15 diameters.
	Fig. 5a.—Pupa of *V. auricoma*, natural size.
Enlarged about 8 diameters.	Fig. 5b.—Pupa of *V. auricoma*; dorsal view of anterior extremity.
	Fig. 5c.—Pupa of *V. auricoma*; 9th segment, lateral view.
	Fig. 5d.—Terminal segment and anal armature.

SCIENTIFIC NOTES.

ON THE ORIGIN OF ARGYNNIS PAPHIA var. VALESINA.—Every British lepidopterist is interested in the interesting green variety of *A. paphia* which we call *valesina*. Every one who goes to the New Forest, and feels he must tell his fellow collectors where he has been, mentions *valesina*. If it be present he joyfully heralds the fact, if it isn't he records its absence with a heavy heart, as if he hadn't been served quite properly. But how many of our lepidopterists know that probably a dozen specimens have never been captured in Britain out of the New Forest. One or two odd specimens in Sussex and a few in Devon are almost the only specimens that have been taken outside that charmed circle in the New Forest. But strange to say the same facts hold as we pass right through Central Europe, and through Central Asia. In all the large wooded districts of this area brown and green females occur (*dimorphic* females, or females having two forms, as we term them). In other more open areas north and south of this central area we find an almost total absence of *valesina.* It is absent in Scandinavia, Northern Germany, Russia and Siberia, it occurs in Southern Germany, Armenia, eastward into China; but while throughout Central Europe and Asia in the large forests the two forms of the female occur side by side, in China the var. *valesina* appears to be the only form of the female known. To the north-east of China in Japan the females are all brown (somewhat darker than ours), but no *valesina.* Here then are some strange facts. The more open northern districts in which *paphia* occurs produce no *valesina*, the old wooded tracts of Central Europe and Asia produce both brown females and *valesina*, but certain Chinese districts produce *valesina* only. That more or less intermediate forms should occur is only natural, and Mr. J. Jenner Weir possesses a series of intermediate forms between the brown female and var. *valesina* taken in the New Forest. That one of the forms, brown or green, was the primitive form of the species is certain. Owing to the colour of the male being brown, and the tendency in Rhopalocera to the production of a more highly coloured male than female form, it would appear that the brown female is the more highly specialised one, and that the green (*valesina*) represents a more original form. There has been, no doubt, therefore, a gradual displacement of the old by the new form which has resulted in the general production of a brown female more closely like the male, and this displacement is still going on. But the Chinese females are all *valesina.* The condition therefore, in this district, must have been more favourable to the preservation of the old form and less favourable to the production of the new.

I would now point out that the var. *valesina* is more particularly attached throughout its entire range to wooded tracts, and it at once suggests itself whether this form is not perpetuated in large forests and wooded tracts, and more liable to displacement in small wooded tracts and more open areas. If so, we should look, it appears to me, for the cause of its origin or production in the excessive moisture of the woods and forests rather than in any other direction. We so frequently get erroneous ideas and vague generalisations of these dark forms being remnants of an arctic fauna, that it is refreshing to find a species which completely overthrows these false assertions. If it were a remnant of a glacial or arctic form, we should not find all the females in the northern range of the species brown, with the green form only in existence in the woods and forests much farther south.

That moisture directly influences the colour of Rhopalocera may be gathered from the following:—"I lately met with a most interesting experiment. Two totally different forms of an Indian butterfly have been found to be a 'wet' season and 'dry' season form, and the wet season form was bred in the dry weather by feeding the larvæ with food placed on a wet sponge so that the atmosphere was kept thoroughly moist" (J. Jenner Weir, F.L.S., *in litt.*).—J. W. TUTT, Westcombe Hill, S.E.

"SYNONYMIC NOTES ON THE MOTHS OF THE EARLY GENERA OF NOCTUITES."—I have to thank Mr. Tutt for calling my attention (*Record*, pp. 9-10) to what he considers to be three serious errors in my recent paper on "the earlier genera of NOCTUITES."

One of these I am willing to admit may be a stupid blunder; though on the other hand it may be the result of a careful study of the original description of *Agrotis ypsilon.* I do not remember, and therefore I can do no less than agree with Dr. Staudinger and others that *A. suffusa* shall be called *A. ypsilon* and not *Peridroma saucia.* Curiously enough I arranged them in our collection under these names.[1]

With regard to *A. segetis* it is the older name for the species and must stand in preference to *A. segetum.*

Agrotis subgothica is admitted as a distinct species in Grote's check-list. It is a common North American species, and if it was ever taken in England (as Stephens says) it was imported. It is quite distinct from *A. tritici.*—A. G. BUTLER, British Museum (Natural History), South Kensington, S.W.

[If Mr. Grote considers *A. subgothica* a species it is hardly possible to get from the fact that the species should be called *A. subgothica*, Grote, and not *subgothica*, Haw. There is no doubt that *subgothica*, Haw. is a variety of *tritici*, and if Grote has described an American species under this name it should be on his authority not Haworth's.—ED.]

NOTES ON TORTRIX PALLEANA, T. VIBURNANA, T. TEUCRIANA (n. sp.), AND T. STEINERIANA var. DOHRNIANA.—In Humphrey and Westwood's *British Moths*, plate 79, are figures of:—(1). *Tortrix palleana* (fig. 11) referred to *Tortrix flavana*, Haw. (No. 5); Haworth refers this to *Tortrix flavana*, Hüb. (No. 157), and Dr. Wocke considers this equals *palleana*, Hb. Vog. and Schm. 30 (1793). This is apparently the pale yellow insect we call *paleana* and used to know as *icterana.* (2). *Tortrix galiana* (figs. 15 and 16), which represent male and female specimens of what our northern friends get on their heaths, and which Dr. Wocke says is *viburniana*, Fab. var. *galiana*, Curt. These specimens have in both sexes generally a more or less complete transverse band on the anterior wings but occasionally the specimens (especially males) are spotless and then become typical *viburniana*, Fab. (3). *Tortrix viburnana* (fig. 12). This represents a specimen of the so-called *viburnana* which we get on the south-east coast (Folkestone Warren, Deal, Dover, Shoeburyness, etc.). The only foodplant of this form that I know of is *Teucrium* and I have never found it away from the coast. The anterior wings are of a shiny greyish brown. This *viburnana* of Westwood is said to be a synonym of *palleana* (*paleana*, Hb.) by Mr. South in the *Entomologist* list, but this is entirely wrong as it is Westwood's *palleana* which is synonymous with Hübner's *paleana.* The two forms are perfectly distinct, and Westwood's *viburnana* is undoubtedly a species intermediate between that author's *palleana* and

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[1] I think this is good *primâ facie* evidence that an error was committed rather than *that a probable change of names* should take place.—ED.

galeana (our northern *viburnana*). It is the *viburnana* mentioned by Mr. Standish (*Entom.*, vol. x., p. 74) as feeding on *Teucrium scorodonia* in the Warren at Folkestone, but certainly not the *viburnana* which Mr. Prest found near York feeding on *Salix repens* (*Entom.*, vol. x., p. 49). I have only one specimen (♀) of the so-called southern *viburnana* with a transverse band and this is very different to the band in the northern species, ending on the inner margin at nearly one-third from the anal angle to the base, instead of almost at the anal angle. For this well-marked southern species I propose the provisional name of *teucriana*. Speaking to Mr. Sydney Webb about the species, I was surprised to find he had already given the matter some attention, and was quite satisfied that the species was not the same as that obtained on the northern moors. I trust something very definite about the life histories of these two species will be obtained this year so that a satisfactory comparison may be made.

The males of all this group have a very close superficial resemblance, and this brings me to another probable error of determination respecting *viburnana*. Among my Continental TORTRICES are some very fine specimens of *Tortrix steineriana* var. *dohrniana*, H.S., and there is scarcely any difference between the males of *dohrniana* and the unicolorous males of *teucriana* (hitherto called *viburnana*) although the females are very different. But *dohrniana* feeds on *Pinus sylvestris*, and it appears to me that Madame Lienig's *viburnana* (referred to in *Entom.*, x., p. 49, by Mr. Fitch as feeding on *Pinus sylvestris*) are much more probably var. *dohrniana* than the allied *viburnana* to which she referred her pine-feeding species.—J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E.

CURRENT NOTES.

A new COLEOPTERON (*Neuraphes planifrons*), taken in Sherwood Forest, has been described and named (*Ent. Mo. Mag.*) by Mr. W. G. Blatch; whilst another species (*Cardiophorus equiseti*, Herbst.) is added to the British list by Mr. W. F. H. Blandford, M.A., F.E.S.

Mr. Eustace R. Bankes, M.A., has written (*Ent. Mo. Mag.*) a long article differentiating *Scoparia mercurella* and *S. cratægella*. I quite agree with Mr. Bankes as to the distinctness of these species and the comparative rarity (in the southern counties at least) of the latter species.

A new British bee (*Prosopis genalis*, Thoms.) has been added (*Ent. Mo. Mag.*) to our lists by Mr. E. Saunders, F.L.S.

Dr. Wood states that *Swammerdamia griseo-capitella* feeds not only on birch but on *Pyrus torminalis* and probably *P. aucuparia*. He also describes (*Ent. Mo. Mag.*) the larva of *S. lutarea*, which he finds feeding both on hawthorn and mountain-ash.

Lieut.-Col. L. Blathwayt publishes an interesting note on a dimorphic condition existing in the Dipteron *Volucella bombylans*.

Two new species of *Gelechiidæ*, added to the British list by Mr. C. G. Barrett, were exhibited by him at the South London Society's meeting of April 10th:—(1). *Bryotropha obscurella*, Hein., of which I apparently have specimens from Deal and Darlington. I do not believe Mr. J. B. Hodgkinson's specimens to be specifically identical with the Deal and Darlington specimens, although Mr. Barrett thinks they are. (2). *Doryphora elongella*, Hein., from Pembroke. This latter species is a most obscure and unsatisfactory looking species, and appears to have no very distinctive characters by which it might be recognized.

Mr. A. F. Griffith exhibited *Penthina grevillana* at the Entomological Society's meeting on March 5th. Mr. C. G. Barrett, *Ent. Mo. Mag.*, vol. xxiii., p. 34, struck this name out of our lists, believing the supposed species nothing more than a pale form of *P. sauciana.* Our ideas of *grevillana* appear to be getting rather mixed.

Mr. N. F. Dobrée states most decidedly that *Agrotis ashworthii*, Doubl., is specifically identical with *A. candelarum*, Stdgr.

Mr. C. G. Barrett has exhibited at the London Entomological Society a specimen of *Botys mutualis*, Zell., taken by Mr. Gregson, near Bolton, Lancashire.

Mr. Gerrard has obtained imagines from larvæ of an *Ephestia* feeding on rice. To me it appears that the species is *E. kühniella.*

Mr. Mansbridge has obtained imagines of a *Tinea* from larvæ feeding on fish guano brought from Norway. The imago appears to belong to *T. biseliella*, but the specimens are large.

I understand that an account will shortly be published by Dr. J. H. Wood of a remarkable discovery made by himself and Dr. Chapman of the oviposition of *Micropteryx*, and the structure involved, which suggests an affinity of that anomalous genus with the sawflies.

At the South London Society's meeting on April 24th, Mr. Adkin read a most interesting paper, "On the occasional abundance of certain species of Lepidoptera!" It is to be hoped that the Society will publish it.

On Tuesday and Wednesday, April 22nd and 23rd, Mr. Howard Vaughan's collection of British Macro-lepidoptera was sold. The varieties fetched high prices, three *C. edusa* vars. being bought one after the other for £10 each, and a fourth for £10 10s.; the latter price was also paid for a var. of *A. aglaia* (damaged); £4 for a var. of *A. paphia;* £9 10s. for two vars. of *V. io;* the same for a var. of *V. atalanta*, and £10 for a var. of *cardui;* £6 10s. was paid for a var. of *C. dispar* ♀, whilst the *Lycænidæ* produced from 2 to 4 guineas per lot; a specimen of *C. caja* was sold for 15 guineas; a series of *P. piniperda* vars. produced £2 10s.; a series of *T. gothica* £2 15s; a series of *E. lutulenta* and *E. viminalis* combined, £2 5s.; a series of *E. lutulenta*, £2; whilst a var. of *C. nupta* brought £4. Many others were worthy of notice, but the sale was remarkable for the fact that almost all the high prices were for varieties; nor is this to be wondered at, when one considers that it is one of the scientific branches of our subject which is yet untouched, unknown, and not understood even by the most intelligent of our workers.

Our readers will be pleased to notice in our pages that *Spilonota pauperana* has been *captured by* Mr. C. Fenn, and *Notodonta carmelita by Mr. Holland.*

VARIATION.

TEPHROSIA BIUNDULARIA var. DELAMERENSIS IN NOTTINGHAM.—*T. biundularia*, so far as I am aware, only occurs in one locality in this district. In this locality in some seasons it occurs in fair numbers, while in others it is comparatively scarce. The time of appearance differs from that given by Newman, who states that it occurs in April and again in July. Here it only appears to occur during June. I have found it from the 1st to the 15th of the month in good condition, the date of appearance varying with the season. We appear to get two extreme varieties here, one very light, the other very dark. I have found the melanic forms so far in greater abundance than the light ones. The dark form is very dark greyish-black in colour, and probably occurs in about the proportion of three to two paler ones. Intermediate forms of course occur. Last season I captured a pair of *T. biundularia in copulâ*, one of the palest form, the other of the darkest, and from them I obtained ova, now having pupæ of this batch, the imagos from which I am waiting anxiously to appear. The wood in which *biundularia* occurs, is situated on a sandy soil, chiefly planted with oak; but it is in a small chestnut plantation that I take *biundularia*, at rest on the trunks of the chestnut trees. Here I believe the larva feeds on chestnut, and pupates at the foot of the trees, as I have rarely taken the imago on oak. Those I have reared I have fed on hawthorn. The larvæ grow very slowly and rarely pupate until August and September. —W. DAWS, New Wood Street, Mansfield, Notts.

[The time given by Newman is that for the allied *T. crepuscularia*, not *biundularia*, which always occurs in the south from about May 24th to June 10th. Newman did not distinguish the species correctly and hence is in error. I have reared the species on birch, sallow, oak, hawthorn, and other trees and shrubs.—J.W.T.]

A SUFFUSED VAR. OF ACRONYCTA ALNI.—I have a specimen of *A. alni* bred by the late J. G. Ross of Bathampton which has the black coloration spread over the basal half of the fore wings.—C. W. DALE, Glanville's Wootton.

A BLACK VAR. OF BREPHOS PARTHENIAS.—I have a specimen of *B. parthenias* also from the late Mr. Ross, which is entirely black without any trace of white or yellow about it. It is one of the best melanic specimens I have ever seen.—C. W. DALE. *March*, 1890.

[I would propose for this the varietal name of *nigra*.—J.W.T.]

MIANA ARCUOSA var. MORRISII.—*Acosmetia morrisii* is described in the *Naturalist* for 1837, p. 88. It is a white var. of *M. arcuosa* and has occurred at Chermouth.—C. W. DALE.

ACRONYCTA LIGUSTRI var. NIGRA.—Mr. A. E. Hall of Sheffield sent me a perfectly melanic specimen of this species a short time since, under the impression that it was *rumicis* var. *salicis*. It is entirely black, the paler markings of the type being entirely absent, the transverse lines being more intensely black than the ground colour. Mr. Hall writes: "I only took two *A. ligustri*, both on the same date, viz. June 11th, 1888, in Wadworth Wood near Doncaster. One I sent you, *the other I have myself*." It is interesting to note what a number of species produced melanic vars. in the wet season of 1888.—J. W. TUTT, Westcombe Hill, S.E.

THERISTIS MUCRONELLA (CAUDELLA, Sta.) var. STRIATA.—Mr. W. Daws of Mansfield, Notts, has sent me a beautiful specimen of this variety. It has the anterior wings of the ordinary ground colour with a longitudinal black streak extending from the base of the wing (parallel to and at a short distance from the costa) to the apex, another black longitudinal streak under the median nervure, joins the upper one just beyond the centre, while a third transverse line parallel to this, extends along the centre and base of the inner margin. Hind wings quite normal.—J. W. TUTT, Westcombe Hill, S.E.

SIZE VARIATION IN LYCÆNA ALEXIS.—As this journal is partially devoted to records of variation a few remarks on the variation in size of *L. alexis* may not appear out of place.

In Mr. South's paper on "the genus *Lycæna*" he gives the average size of *alexis* as 1.20″ in the male and 1.10″ in the female (English specimens), and mentions as extremes in size, ♀'s taken at Folkestone .75″ to .85″, and ♂'s taken at Ventnor from 1.30″ to 1.40″.

On looking through the series in my cabinet I found the following specimens taken at different times and in various localities (as the average in both ♂ and ♀ corresponds with Mr. South's insects I only quote abnormal wing expansions).

	Sex.	Locality.	Size.	Date.
1.	♀	Hempsted, Gloucestershire...	1.75″ ...	'89
2.	♂	Painswick, „	1.53″ ..	'87
3.	♂	Upton St. Leonards, Glo'shire	0.95″ ...	'88
4.	♂	St. Leonards, Hastings ...	0.625″ ...	'87
5.	♂	St. Leonards, Hastings ...	0.875″ ...	'87
6.	♀	St. Leonards, Hastings ...	0.812″ ...	'87

Thus it will be seen No. 1 is larger than Mr. South's ♂'s 1.4 (Ventnor), and No. 4 smaller than his Folkestone ♀'s.

In fact No. 1 is the largest ♀ and No. 4 the smallest ♂ I have ever seen.

No. 1 was not captured by myself, but I was present when it was taken, all the others are of my own taking.

If any of the *Record* readers can beat above record it will prove very interesting. No. 3 is the smallest I have seen in five years in this locality.—M. STANGER HIGGS, Upton St. Leonards, Gloucester.

[There were several dwarfs in Mr. Howard Vaughan's collection lately sold; I have some very small ones, but have taken no measurements. —ED.]

NOTES ON COLLECTING, Etc.

SPRING COLEOPTERA.—"Spring's delights are all reviving, Hawthorn buds give joyful tidings"—at least, so the poet says—I do not remember his name now, but that is of little consequence, as he did not write about beetles; however, the news conveyed in the lines is indeed welcome to the entomologist, who, with beating stick and umbrella, again betakes himself to his favourite pastime of seeking for *insects that are specially* prevalent at this season. The pretty leaflets and fragrant flowerets which clothe the trees and shrubs present great attractions for beetle-life; and, favoured by the bright sunshine during his excursions, the coleopterist would not fail in obtaining a bountiful supply wherewith to enrich his collection. It is in the gay springtime, just as the delicate blossoms have burst their coverings, that many brightly-coloured species of *Curculionidæ* are to be sought for; several *Longicorn* beetles also put in their appearance, besides numerous other groups.

The hawthorn blossom of the year 1884 was certainly a magnificent sight, and in the delightfully fine weather which prevailed at that time I paid several visits to the bloom in the localities of Loughton, Esher, and Farnham (Surrey). Loughton is rich in hawthorn, and on May 16th of that year I made the first attempt to work this district. In selecting the trees on which to commence operations, it is always best to choose those that are not fully out, as the strength of the aroma evaporates quickly. The beautifully marked *Rhynchites æquatus*, *Anthonomus pedicularius*, and *Adimonia sanguinea* may be obtained commonly in this neighbourhood; a good series of *Rhynchites pauxillus* may also be got, odd specimens of *R. aliariæ*, *R. pubescens*, and indeed nearly all the species of the genus *Rhynchites* occur at Loughton. *Clytus mysticus* likewise turns up occasionally; and its congener—*C. arcuatus*—is reputed to have occurred here, but I have never found it, and have no reliable information concerning its capture in recent years. *Tetratoma ancoræ* can be beaten from hornbeam; the prettily striped *Apion genistæ* is found freely on the yellow flowers of *Genista anglica;* and, accompanying the latter species, *Strophosomus retusus* is moderately common.

The Esher locality is disappointing to many people, but those who know its nooks and corners are sure to find something worth bottling even in the worst season. I remember once meeting a party of entomologists out here for a field day, and their net results were far from numerous. My own captures amounted to a considerable number on this occasion. Field days, in my opinion, are of little or no use for collecting purposes, and it is much better to hunt in couples rather than in a body. In the first place, too many collectors are a nuisance to each other; and secondly, they get over too much ground and also too quickly. It may be urged that these excursions are mainly for prospecting new country, but surely work of this kind is more adapted for other seasons of the year. For my part, I invariably make my surveys during winter.

To return to the hawthorn blossom. At this locality (Esher) many of the commoner species of *Longicorns* frequent the bloom. On one afternoon I obtained *Grammoptera ruficornis*, *G. tabaccicolor* (both commonly), *Polyopsia præusta*, *Clytus arietis*, and nearly a dozen of *C. mysticus*. In addition to these, *Cychramus luteus* and *C. fungicola* were obtained from a hedge skirting a patch of woodland; it may be as well to mention here that Dr. Sharp regards the two latter as sexes of one species. The genera *Epuræa* and *Meligethes* were in profusion. Some half-dozen *Balaninus nucum* rewarded my efforts; but *B. villosus* was scarce on oak. *Cleonus nebulosus* is sometimes found roaming on the heath, but more often is captured in the sandpits, and in the same place also a number of commoner species.

On June 2nd of the same year I journeyed to Farnham with the view of continuing operations at the hawthorn. The season had now advanced considerably, and the bloom being fully expanded was not so attractive to the insects. Nevertheless, besides meeting with many species previously mentioned, I obtained several specimens of *Pachyta collaris*, a species generally to be found in hop gardens, its habitat being in the hop-poles. Owing to a slight argument with the gamekeeper at the Old Park, I made my way towards Moor Park, and by beating the broom growing on the hillside of Moor Park House I procured *Balaninus tessulatus*, *Gonioctena litura* (commonly), and *Asclera cærulea* (this latter is likewise to be found on the trunks of poplar trees). Proceeding onward, I ascended Crooksbury Hill, and again insects were plentiful; the most noticeable being *Luperus flavipes*, which seemed attached to the young oaks. The water plants were showing vigorous signs of life, and *Donaciæ* were disporting themselves in the sun, but this interesting genus deserves a separate paper, therefore I will for the present defer any remarks on them.—G. A. LEWCOCK, 73, Oxford Road, Islington.

CAPTURES AT SALLOWS.—There is only one small clump of sallow in Portland, which was in full bloom by March 13th, and was *passé* a fortnight afterwards. At this I only meet with *Tæniocampa gothica*, *stabilis*, *rubricosa*, and *Xylocampa areola*.—E. W. BROWN, Portland.

On favourable evenings during the last fortnight moths have been most abundant at sallow in some districts. Dr. Chapman at Hereford has found them especially abundant in the Hereford district, and I now have—thanks to him—long series of *Tæniocampa leucographa*, *T. miniosa*, *T. rubricosa*, *T. instabilis*, *T. stabilis*, *T. cruda*, *T. gothica*, and *T. munda*, on my setting boards, together with a few specimens of *T. populeti* and *T. gracilis*, and one specimen of *Pterophorus monodactylus*. These were all obtained during the latter fortnight in March. When the wind changed to the north and north-east on March 31st the moths suddenly became rare. This shows how a north or east wind influences the activity of night-flying lepidoptera.—J. W. TUTT. *April*, 1890.

My experience of sallow this year has been an almost total failure. I have just returned (April 10th) from a three days' expedition in search of *Dasycampa rubiginea* and the *Tæniocampidæ*, my bag being two *Tæniocampa rubricosa* and one *Xylocampa lithoriza* (*areola*), whereas, last year, in the same place, I took four *rubiginea* and dozens of *gracilis*, *rubricosa*, *lithoriza*, and a few *Trachea piniperda;* whilst the year before I took seven *rubiginea*, and from ova which I obtained from these I afterwards bred a beautiful series. Perhaps the cold wind accompanied by rain prevented their appearance.—R. B. ROBERTSON, Calcot, Reading.

Doubtless many of us were agreeably surprised this spring at the unusual abundance of the *Tæniocampidæ*, but as business engagements and other arrangements prevent many from engaging in active collecting so early in the season, I do not doubt that a few notes upon my experience a few weeks ago at Hereford will be read with interest. I was induced to make so long a journey through hearing of the special abundance of one or two of the more local species there obtained, and further by the remarkably warm and favourable evenings, for the time of year, which we were then, during the last week of March, experiencing

Unfortunately, with the glorious uncertainty of our British climate, the weather turned much colder and clearer just as I left London, and the four nights I spent at Hereford were all more or less (usually more) frosty, with a bright moon and cloudless sky. Leaving London on Monday morning, 31st March, almost losing my train through my laudable efforts to avoid delaying the basket of the *Record* Exchange Club, which I received by post when packing, and just managed to start again on its rounds, I reached Hereford about 3.0 p.m., a most glorious sunny cloudless sky overhead, but with a clear atmosphere and cold wind which augured badly for our sport, and, after unpacking those few *impedimenta* without which the collecting lepidopterist cannot travel, I hastened to the *rendezvous* to meet a well-known entomologist resident in that neighbourhood, to whose courtesy and intimate acquaintance with the locality I am indebted for much of my knowledge. As the train left us at our destination rather too early to commence working the sallows we spent the hour or so before dusk in looking round, my friend most kindly pointing out the numerous features of interest which the district presents to the entomologist. During this cursory inspection we succeeded in finding a few *Brephos notha* at rest upon the aspen poplar (*Populus tremula*), including one pair taken *in cop.* The cold east wind evidently prevented *notha* from indulging in its usual wild flight, and all our efforts in shaking the taller aspens only succeeded in dislodging one more that evening, although during the bright sunshine of the following morning I managed to shake down a few more, of which after an exciting chase fully half escaped. Although the wood was plentifully dotted with birch trees (*Betula alba*) I did not see a single *B. parthenias* during the next morning which I spent there, although the previous Saturday, in the London district, I had found it well on the wing. On our way back we picked up an odd *Cymatophora flavicornis*, also resting on the twigs of the lower aspens, and by trunk searching found a few *Lobophora carpinata* at rest, with *Diurnæa fagella*, both light and dark forms common as usual. As it was now rapidly getting darker we made our way back to the inn, where, after a little light refreshment, we got our lanterns and started.

I may here mention that in the woods we were then working, sallows were far from plentiful and scattered far apart, which, while adding considerably to the miles walked, yet renders each sallow more remunerative and consequently better worth visiting. It is a great mistake to select as working ground spots in which too many sallows occur, especially where some of these are in inaccessible spots, as the moths, by some strange instinct, always seem to prefer the more inaccessible trees. Although so clear a night, I was pleasantly surprised at the sport we met with, *Pachnobia leucographa* turning up in what I regarded as a satisfactory manner, *T. miniosa* being rather more scarce. I need hardly say that *gothica*, *stabilis*, and *cruda* gave abundant proof of their presence, while *instabilis*, *munda*, and *gracilis* were decidedly scarce, the ground being, I think, not favourable for the last species; which also is, in that locality, usually the last to emerge and may not have been fully out. Of *munda* I obtained one very nice variety, and was also able to secure a couple of *populeti*. In working the sallows we found the female blossom just as attractive to the moths as the male, which is a fact, I think, not generally allowed; but the uncertainty doubtless arises from the fact that the female blossom not being so conspicuous at dark as the handsomer bright yellow male is often passed by the collector as being "over."

We did not see much of *P. rubricosa* that evening, but before I left, it occurred in greater plenty, although owing to each night being colder than its predecessor, the moths grew less plentiful; this, I think, is also a later species to emerge, those that I took being in very fine condition.

On my last evening we were tempted out in a different direction, in the hopes of taking *opima*, but it was a most unfavourable evening, even *gothica* hardly caring to court the publicity of the moonbeams, and but for some eight or ten *Hoporina croceago* we had a very poor evening.

However, as during my short visit I took specimens of each of the *Tæniocampidæ* except *opima*, and of each of the *Pachnobiæ*, excepting *hyperborea*, I was on the whole very pleased with my few days' holiday, although, had the warm evenings lasted, I should have doubtless been far more successful in point of numbers.—ALBERT J. HODGES, 2, Highbury Place, N. *April*, 1890.

The sallows are well out now in this district. I have this evening (March 31st) captured, among other species, fourteen *T. populeti*. —C. FENN, Eversden House, Lee, S.E.

Sallow work has not been as good as usual this spring with us here. Cold north-east wind and bright moonlight nights nearly the whole time. Sugar also did not pay so well for the same reason. I sugar for *T. munda* only at this season, as this species prefers it to sallow. I sometimes get a dozen in a night on sugar and about two at sallow.—W. HOLLAND, Reading.

Up to the present (April 18th) the sallows are not yet in a condition fit for beating, as the catkins, except in very sheltered places, have not yet opened.—J. WYLIE, 12, Union Street Lane, Bridgend, N.B.

As far as larvæ at sallow are concerned we have nothing to complain of at Brighton. I should think I obtained by picking the catkins quite 100 *Xanthia cerago*. This was on the 30th of March, when the sallows were mostly in full bloom.—LOUIS MEADEN, Brighton.

DASYCAMPA RUBIGINEA AT CLEVEDON, SOMERSETSHIRE.—For the last year or two this local and beautiful insect has not been so plentiful in the Clevedon district as formerly. On referring to my notes for 1885, I find my captures during that autumn numbered seventeen; in the following year nine specimens were taken; in 1887 seven, four of which were taken at sugar, after the ivy bloom was over; the autumns of 1888 and 1889 only produced one specimen each, though the insect was well searched for. Of specimens taken in the spring after hybernation, two were taken at sallow on April 1st, 1885; two on April 2nd, 1887; and a single specimen at sugar on the 9th of April, 1888; so that it would appear, from some cause or other, the species is much less frequent in this district than formerly. The latter end of November and beginning of December in 1888 were unusually mild, and, as the ivy bloom was over early, I tried sugaring as an experiment, and was very agreeably surprised at my luck in taking four beautiful specimens on the evenings of November 28th and December 1st, two on each evening, but the weather becoming frosty I had no further success that season; a single frosty night at this time of the year is often sufficient to kill or drive all moths frequenting ivy bloom into winter quarters, and I have never found that a succeeding spell of mild weather ever induced them to appear on the wing until the following March.

Rubiginea is what I should term rather a shy insect. You find it in out-of-the-way places, seldom occupying a front seat on the ivy bush, and it has the habit of seeking the sweets of blossoms partially hidden; in fact, the insect wants well searching for on bushes which are not amenable to the beating stick; it also appears to have a partiality for small detached bushes of ivy with but few heads of bloom, and the collector is as likely to find a *rubiginea* on a bush of this size as on a large one close by with abundance of flower-heads. I have only on one occasion taken it on the wing; it is rather a sluggish flyer. This, I suppose, partly accounts for the fact that the insect is always in good condition: and I believe I can say, without exaggeration, that I have never seen or taken a worn or dilapidated specimen either in the autumn or after hybernation; for even those taken in spring, with the exception of being slightly paler than autumn specimens, are quite fit for the cabinet. Hybernated specimens sometimes appear in March if the weather is mild. I once took a *rubiginea* at rest in close proximity to a pair of *flavicornis in cop.* The female lays her eggs during April. Captain Robertson, when living in the neighbourhood of Winchfield, took several imagines at sallow in the spring of 1888, from one of which he got a few ova, and was fortunate in rearing a nice series; the larvæ were fed on apple. Instances of breeding this insect are rare; in fact, I have only heard of one other: in this the larvæ were fed on plum. In conclusion, I may say I have never seen any inclination to variation in the markings in any specimen of *rubiginea;* some few are lighter in colour than others, but age may possibly account for this.—J. MASON, Clevedon Court Lodge, Somerset. *April* 14, 1890.

HABITS OF LOBOPHORA VIRETATA.—In its localities in this district the ova of this species may be found during the last week in April, on the terminal shoots of holly, particularly those at the *top* of the trees bearing flowers. The larvæ are hatched out in from seven to twelve days, feeding first on the flowers, if there are any, next on the green berries, and lastly on the young leaves. In confinement they take readily to common privet, and devour the bark as well as the leaves. The larvæ are difficult to beat, a sheet spread on the ground and a ladder being necessary. In emerging the perfect insect is somewhat erratic in confinement, some appearing as a second brood in August and September, others from the same batch remaining through the winter in the pupal state.—H. TUNALEY, Erdington Hall, Birmingham.

[This species is also partially double-brooded in nature. Such instances have come under my notice at Deal and other localities, and there are a few records in back numbers of the Entomological Monthly Magazines —ED.]

MOTHS AT FLOWERS OF TRITOMA UVARIA. — Have any readers of the *Record* noticed the fondness of moths for the flowers of the autumnal blooming *Tritoma uvaria* (popularly known as Red Hot Poker, or Torch flower)? I noticed this especially last autumn, taking on one evening specimens of *Anchocelis litura*, *A. lunosa*, *Xanthia citrago*, *X. cerago*, *X. silago*, *Agrotis saucia*, *A. nigricans*, *Noctua xanthographa*, *Tryphæna pronuba*, *T. orbona* (*comes*), *Amphipyra tragopogonis*, *Cidaria russata*, and *Thera variata*. The moths seemed quite as stupefied by the flowers of this plant as by ivy bloom, and were boxed quite as easily.—J. MASON, Clevedon Court Lodge, Somerset.

NOTODONTA CARMELITA AT READING.—I was fortunate enough on April 25th to find four *Notodonta carmelita* at rest on birch trunks. This is the first recorded occurrence of the insect in this neighbourhood. —W. HOLLAND, 111, Southampton Street, Reading.

[This species has been very rare of late years, and the record of its occurrence is most interesting.—ED.]

TIME OF APPEARANCE OF AGROTIS OBELISCA.—One possible reason for the uncertainty which seems to attend records of captures of this undoubtedly distinct species is not only its great superficial resemblance to certain vars. of *A. tritici*, but also in my opinion that it is not generally worked for at the right time of the year. My experience in the Isle of Wight during the autumn of 1889, in which season all the *Agrotidæ* were unusually early, shows that quite the end of August is the very earliest date at which it is possible to secure this species, which I then captured sparingly until the middle of September; but in the previous autumn when I was delayed during the first two weeks of September, I found it in about the same numbers and in good condition on the 17th, and took it for about a week from that date, when the early cold weather set in and effectually rendered sugaring useless.—ALBERT J. HODGES, 2, Highbury Place, N.

[These dates are most useful, and will help our readers to form a general opinion on any suspicious specimens taken. *A. tritici* is most abundant during July and the first fortnight in August, good specimens are rarely taken later in normal years.—J. W. T.]

KILLING LEPIDOPTERA.—Year by year, as England grows more populous and the desire for higher education spreads, our favourite science of Entomology gains more and more recruits. The Entomologist's green net, which used to be a sort of "red rag" to the whole country-side, attracts but little more attention than a passing railway train; yet prejudice in this, as in many other matters, is apt to die very hard. It is no doubt owing to the popular writings of such authors as the Rev. J. G. Wood and Mr. A. R. Wallace, that the world in general looks less askance at the pursuit of some special branch of Natural History, such as that which it is the object of this magazine to promote.

Now there are various considerations which induce people to take up the study of some particular science, but it is no doubt the surpassing beauty of the world of butterflies and moths that first attracts the notice of the outsider. Perhaps on some fine afternoon in May he happens to be strolling in a country lane, and having a smattering of knowledge about plants, he gathers a piece of water-betony that the aroma may once more salute his sense of smell. Imagine his surprise when on the underside of a leaf of this *Scrophularia*, he sees a large chestnut brown insect, pendent with folded wings. His natural curiosity prompts him to examine it more closely; its hinder wings expand and display their beauteous rosy tint, edged with a peacock's eye. For his treasure is none other than the Eyed Hawk-Moth, *Smerinthus ocellatus!* He is wrapt in admiration (as indeed who would not be?) until his ardent gaze is diverted to a lovely butterfly, with wings orange-tipped that has settled on a wild parsley head in yonder flowery mead. How much he wishes that his prisoner could be preserved by some method which would make it remain "a thing of beauty and a joy for ever"—well not quite "for ever"—but at any rate for his own brief lifetime. He transports it safely home, and spends the evening in reading up all he can find about the order "Lepidoptera" in such books as his library happens to contain; most probably he can find nothing about the subject except some very "general" information in an Encyclopædia. Then, perhaps, on the morrow he makes inquiries as to whether there is anyone in his neighbourhood who knows about such things. The upshot of his investigations is that Entomologists are very much divided in opinion as to the best way of killing any insect they may catch. Laurel leaves, cyanide bottles, chloroform and ammonia, all have their advocates! How is the tyro to decide when experts differ? There is no doubt a good deal to be said for each of these four methods. Let us say a few words on each, more for the sake of inviting comment from our readers, than of settling such a knotty point.

(1). Young laurel leaves, crushed and placed in an air-tight tin, will deprive an insect of life almost immediately, and will, so say its advocates, keep an insect beautifully relaxed—for a moderate period at any rate—until it may be convenient to set it out. Laurel leaves are easily obtainable, which is a great point in favour of this system, but on the other hand, it is a great drawback to their use that they require renewing frequently, so that this method is but a clumsy one at best.

(2). It is the prussic acid in laurel leaves that proves so fatal to insect life, and the same principle is contained in cyanide of potassium, whereof the cyanide bottle is composed, a layer of plaster of Paris being superimposed. These cyanide bottles are comparatively permanent, most of them not requiring the cyanide to be renewed for some two or three years, others not for ten or twelve, the difference no doubt being brought about by a loose or closely fitting bung. The temperature, also, affects the potency of the cyanide very much. The bottle kills and relaxes insects much more rapidly in hot weather than in cold. In any case, no sooner is the specimen dead than *rigor mortis* supervenes, and does not pass away till about the twentieth hour in the case of smaller insects, such as CRAMBIDÆ and TORTRICES, and not until about the fiftieth in the case of larger species. But directly this rigidity departs, the specimen is in a most beautifully relaxed state, and every part can be moved readily and arranged *in loco quo* with the utmost ease. Specimens treated in this way last for many years, and are wonderfully exempt from mould, the lepidopterist's most deadly enemy.

Whatever mode of killing he may adopt, let the beginner most earnestly beware of pinning his captures after they are dead, and placing them in a zinc relaxing box. Most certainly such specimens will mould in years to come, and then their pristine beauty will disappear for once and aye.

(3). Some collectors object to cyanide, on the ground that specimens subjected to it are very liable to verdigris thereafter; it may be so, but can they say that any system offers a remedy for this? Of course the great objection to the use of cyanide, is that one cannot set out one's captures immediately on coming home, and if they are not set out just *at the proper time*, they become stiff again and difficult to manipulate.

This no doubt is a serious drawback; but the Entomologist must be a man of method in arranging his times, and should not endeavour to set more specimens than he absolutely requires. Many collectors of the Micro-Lepidoptera chloroform their specimens as brought home in pill boxes, turn them out directly, pin and set them at once. Many even of the smallest insects come to life again on the boards if they are treated thus, and give a just handle for complaint to those who object to Natural History on the ground that its votaries are cruel. Chloroform is also very useful for killing green or delicately coloured insects which it is not advisable to subject to cyanide of potassium. The *rigor mortis* occurs at once (as in the case of cyanide) but passes off in about half the time, *i.e.*, 24 hours for an ordinary insect; but under this system the wings are very apt to cockle, especially if the weather happens to be warm.

(4). With regard to ammonia—by the way I know a celebrated but illiterate collector who invariably calls it "harmonium"—I have had but little personal experience, and, as I thoroughly believe in the aphorism, *experto crede*, I trust that some among your numerous readers will step forth and champion its merits.—Rev. G. H. RAYNOR, M.A., Victoria House, Brentwood, Essex.

[I always use ammonia for killing all my specimens.—ED.]

LOCAL NATURAL HISTORY COLLECTIONS.—These are without doubt of the utmost educational value, when looked after by capable persons, but when they are carelessly made up, wrongly named, etc., they become positively harmful from an educative point of view. Folkestone, the home of so many first-class lepidopterists, boasts a fine museum. A small cabinet contains the butterflies (to illustrate the fauna of the district). In it we find *Papilio podalirius*, *Parnassius apollo*, *Argynnis niobe*, *Polyommatus chryseis*, etc.; in fact, all the species which are *not* found in Britain, but which we ridiculously retain in our British lists. *Melitæa athalia* is called *M. didyma*, and a long series of *M. didyma* is called *M. athalia*. Female specimens of *icarus* figure as *bellargus*, and so on, *ad nauseam*. Surely the Folkestone lepidopterists can name the butterflies in their own district!—J. W. TUTT, Westcombe Hill, S.E.

NOTES ON HELIOPHOBUS HISPIDUS, WITH A DESCRIPTION OF ITS LARVA.—Never having seen the life-history of the local *Heliophobus hispidus* described, I venture to send a few notes on this insect as observed at Portland.

The imago is found from the beginning of August until early in October, being most common during the first half of September. It is generally distributed over the island, but is plentiful in only some half dozen localities—occurring singly elsewhere. These localities are steep slopes, covered by long grass, and the insect is found at night sitting on the stems of the grass. It is very quiet and lethargic, allowing itself to be boxed off the grass and remaining motionless on the side of the box. I have never seen them on the wing except when excited by the lamp, and then they generally fly straight to it and settle on the glass. I have never taken them at sugar, or in any other manner than by boxing them off the grass, but I know they have been captured at light in some plenty. I bred two in 1889—one emerged on 26th and the other on 30th August.

From a ♀ taken on 2nd Sept., 1889, I obtained some 200 ova—

deposited on the 2nd and 3rd, and on the 13th the larvæ emerged; but after feeding them for ten days on lettuce, which I saw by the frass they were eating all right, I determined to turn them out on the grass at a marked place, and did so. During the winter, however, I found that a party of convicts had been at work near my larvæ preserve (which was inside the Verne Citadel) and that the place had been covered by rubbish, and in consequence I only found one larva there. Wishing to know something of their habits, on the 18th Feb., 1890, I began to search the grass in the localities where the imago had been plentiful, and on that evening I found half a dozen, which, to my surprise, were nearly full fed, and on the succeeding evenings I took a few more. Like the imago, they are very lethargic, not falling off their food plant when touched, but requiring considerable persuasion to induce them to quit their hold of the blade of grass on which they may be feeding; indeed, some held on so tightly that it was necessary to break off the blade of grass in order to take them. I found them generally at the bottom of the slopes, on the tufts of grass overhanging places where the soil had been crumbled away by the action of the weather, and I imagine they would probably select these places, where the ground is loose and friable, in which to pupate. On 21st Feb., 1890, I placed eight of the largest of the larvæ in a large glass bottle, with some two inches of sifted earth at the bottom, and saw that they buried themselves entirely in the earth during the day, coming up after dark to feed on the grass which I gave them fresh every day. These eight had all gone down by the 10th March, and on the 24th I looked to see how they had pupated and found that they had spun a compact cocoon of silk and earth. I opened one cocoon, but the larva had not then turned. The other larvæ I kept in a large box with a layer of earth at the bottom, and gave them a sod of grass, but, when it was necessary to renew the sod, I found, on breaking up the dry one, that a number of the larvæ were hidden in it, and as there was great risk of injuring them in this way. I tried a different plan. I left the second sod undisturbed, and when fresh grass was required just cut a handful close to the roots and scattered it in the box—a fresh handful every day—and after about a week, when there was an accumulation of grass in the box, I cleared it all out, still leaving the sod undisturbed, and started afresh. I find this plan answers very well for grass feeders.

The following is a description of the larva:—Head light brown, narrower than the second segment, and emitting several slender hairs, with a shining black crescentic mark on each cheek. Body grey, with a brown crescentic plate on the second segment, and pale narrow dorsal and subdorsal stripes. The dorsal area scattered over with minute short hairs, which are especially noticeable on the hinder segments. The paler dorsal stripe is bordered by very slender darker longitudinal lines, and at the junction of the segments (in these darker lines) a pair of black dots are placed opposite each other; in the centre of each segment a pair of very small, back dots are placed, one on each side of the dorsal line; the paler subdorsal lines are also bordered with darker lines, and in the upper line which thus borders the subdorsal line is a series of short longitudinal black marks, one on *each side of* each segment; these dark lines appear to be connected by slender, dark, curved, dotted line (not at all conspicuous, but showing under a lens) the curve passing backward on either side of the segment, passing up over the dorsal area and uniting in the dorsal line, thus forming a crescent on each segment, the horns of the crescent being the dark marks and directed towards the head; there is also a short black diagonal line on the side of each segment (below the subdorsal line) but it is not at all conspicuous. The spiracles consist of black dots. The ventral area is yellowish, with a faint greenish tinge.—E. W. BROWN, The Verne, Portland.

NOTE ON EUPITHECIA PUMILATA.—I fancy this species has regularly three broods each season, in a state of nature. Until last year my knowledge of it was as follows:—A brood of imagines flying in April and frequenting sallow blossom and furze bushes, the larvæ of this brood (I presumed) fed upon various flowers, chiefly those of the furze, and developed the second brood of imagines, which I was accustomed to net in the summer. What I supposed to be the offspring of this summer brood, I had frequently beaten, as larvæ, from ragwort, etc., in September and October, and had reared from them the spring brood the following year.

About the 20th of May last year, I beat some larvæ of this species at Croydon from the blossoms of furze, these produced imagines during July, the last specimen emerging on the 20th of that month. Whilst on a visit to Aldeburgh, Suffolk (as stated in this magazine last month) I found the second brood of the perfect insect very common, about the 12th of July, this date shows that the emergence of the bred specimens was not premature. From some females captured at Aldeburgh I obtained a number of ova; these hatched by the end of July, fed very rapidly, pupated by the middle of August, and emerged on the 23rd and 24th of that month (two specimens only, the remainder of the larvæ dying).

From the result of the above observations the life-history of this species appears to be briefly thus in the south and east of England. A brood of imagines emerges in April, these deposit ova on various plants, one of which, and probably the chief, is furze (*Ulex*), the larvæ from those are full fed by end of May, pupate and emerge about the middle of July as a second brood of imagines, these in their turn deposit ova by end of July, produce larvæ in a few days, which develop rapidly, pupate, and emerge as imagines by the end of August, as the third brood. This generation, no doubt, consists of the parents of the larvæ we are accustomed to beat in September and October from ragwort, etc.—W. G. SHELDON, Croydon. *March* 12, 1890.

FOODPLANT OF TORTRIX FORSTERANA (ADJUNCTANA).—Some ivy plants in my back garden are quite brown with the work of the larva of *Tortrix forsterana*. I never saw the insect in the garden until last summer but it has soon made itself at home here. Treitschke says that the larva of this species feeds on leaves of *Pinus picea*, probably an error; while Zeller gives *Vaccinium myrtillus*, a food from which Mr. J. B. Hodgkinson has bred it. The larva hybernates when very small in a little hollow formed by joining two leaves together. In the early spring the larva commences to feed again, fastening a part of one leaf almost flat down on another, living between them, and eating away the parenchyma of the leaves forming its home. It leaves the epidermis, thus making large conspicuous blotches, which is increased by the unaccountable fact that one of the leaves forming its abode, is more or less dead and separated from the plant. I do not know, but I believe that after the larva fastens two leaves together, the stronger and more rapidly growing leaf, pulls off the weaker; I cannot understand otherwise why the leaf should always be dead. I have before me now a larva living between three leaves, two of which have been separated from the plant, and are quite brown, whilst the other, to which they are attached, and on which the larva is feeding, is a strong growing leaf.—J. W. TUTT. *April 1st*, 1890.

NOTES ON WINTER MOTHS.—(1) *Hybernia aurantiaria*. The male sits on the twigs of the oaks and birches after dark, and pairing takes place *after* about 9.30 p.m. The larva is common on birch in May. (2) *Cheimatobia boreata*. The male sits on the leafless twigs of the birches in November, the ♀ may also be taken in the same way, generally *in cop.*, directly it is dark. The species is abundant at Chiselhurst. Larvæ on birch in May. I have often found the ♀ of *boreata in copulâ* with the male of *brumata*, and *vice versâ*. The progeny are not to be distinguished from *brumata*.—C. FENN, Eversden House, Burnt Ash Hill, S.E.

NOTES FROM NEWBURY.—From April to November, 1889, the *Lepidoptera* in all stages were exceedingly scarce in the Newbury district. The Rhopalocera were especially poorly represented, *Euchlöe cardamines*, *Nemeobius lucina*, *Lycæna icarus*, and *L. corydon* being the only species appearing in any numbers. I only saw about a dozen specimens of the genus *Vanessa* throughout the season.

Sugaring proved almost a failure, the only capture worth recording, being a fine specimen of *Acronycta leporina* which I took among lime trees, June 8th. I did not see a single specimen of *Agrotis exclamationis*, or *Apamea oculea*, and only about half a dozen *Cosmia trapezina*, and *Cerastis vaccinii*, though sugaring the same grounds, where in 1888 these NOCTUÆ were perfect pests.

The best insects that fell to my lot, were attracted by light; during the season I took, among many commoner species, *Nola cucullatella*, *Trichiura cratægi*, *Neuria saponaria*, *Miana arcuosa*, *Agrotis agathina*, *Noctua dahlii*, *Habrostola triplasia*, *Petasia cassinea*, *Zonosoma orbicularia*, *Acidalia holosericata*, *Emmelesia adæquata*, *Eupithecia pulchellata*, *E. plumbeolata*, *E. satyrata*, *E. irriguata*, *E. sobrinata*, *Lobophora viretata* and *Myelois advenella*.

The larvæ of the commoner genera of the Geometrina were generally plentiful the two species of *Cheimatobia* being especially numerous. While looking for *Clostera reclusa* larvæ I was fortunate enough to find a few larvæ of *Tethea retusa* on dwarf sallow. Pupa digging in common with the other modes of collecting was disappointing. I found nothing worthy of mention except *Notodonta trimacula* which occurs here not uncommonly. I found several of my "prepared trees" had been carefully worked round by moles. These animals have been remarkably plentiful in this neighbourhood for the last two years, and this may account in part for the scarcity of *Noctuæ* and *Sphinges* in the district *during the past* season.—M. KIMBER.

Forcing Pupæ.—The simplest method to force pupæ appears to me to get a large flower-pot, half filled with mould (drain well at bottom), make the top of the mould fairly hard, strew a thin layer of moss on mould on which place the pupæ, then another thin layer, tying over the top a piece of calico. I then place the flower-pot on the kitchen mantel-shelf, and every morning pour about half a small teacupful of water on the calico, and let it soak through into the pot. By this simple means I have kept my setting boards occupied since Christmas. Heat is apparently harmful to most species without moisture.—J. W. Tutt. *April*, 1890.

Spilonota pauperana.—I had the pleasure of taking a couple of this species during the last week; they were beaten from rose.—Chas. Fenn, Eversden House, Burnt Ash Hill, Lee, Kent. *April 28th*, 1890.

Species two years in pupa.—I had five splendid *Asphalia ridens* emerge at mid-day yesterday (March 28th), from pupæ that I thought were quite dead. The larvæ were beaten in the New Forest in July and August, 1888.—A. J. Hodges. *March 29th*, 1890.

Last month I suggested that many northern species remained normally in the pupal stage two or more years. I have bred another fairly long series of *Emmelesia albulata* during the last week, from pupæ obtained by the Messrs. Salvage in Shetland in 1888. I bred a large number of specimens last year, from the same consignment of pupæ.—J. W. Tutt. *April 1st*, 1890.

PRACTICAL HINTS.

(*a*) Where birches were cut down in the winter of 1888–89, look carefully at the stumps between the wood and bark, during the early part of May. The frass will at once show the presence of *Sesia culiciformis.*

(*b*) Where oaks have been cut down during the last two or three winters, look carefully at the stumps between the wood and bark, during May. The frass will show the presence of *Sesia cynipiformis.*

(*c*) During June look in reed beds for leaves that show traces of having been eaten. At night the larvæ of *Leucania straminea* will most probably be found.

(*d*) During May watch carefully the flowers of *Stellaria holostea* (stichwort). In the morning, when sunny, the flowers are frequented in our southern woods by large numbers of *Asychna modestella.*

(*e*) Open clearings in woods where the blue bell abounds are the favoured haunts of *Lycæna argiolus.*

(*f*) During the first and second weeks in June the first brood of *Agdistis bennetii* is to be found on salt marshes where *Statice limonium* grows. They cannot be taken much before eight in the evening.

(*g*) During May look for plants of burdock, with little round holes in the younger leaves; the pale green larva of *Aciptilia galactodactylus* will be found on the under surface of these leaves.

NOTICES, REVIEWS, Etc.

LARVA COLLECTING AND BREEDING, ETC., by the Rev. J. Seymour St. John, B.A. This handy little book is perhaps the best compilation that has been put into the hands of the practical lepidopterist for some years. The size of the book will increase the value, and the lepidopterist who is not able to derive information from it must be in a very happy condition. The index is a very valuable addition. No lepidopterist should be without it.—ED.

CATALOGUE OF BRITISH HYMENOPTERA, by E. Saunders, F.L.S. This new and revised Catalogue, which should be in the hands of every hymenopterist, can now be obtained either as a reference or label list from Mr. W. H. Harwood, Colchester.—ED.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*April 17th*, 1890, Mr. J. A. Clark, F.E.S., President, in the chair. Mr. Bellamy exhibited specimens of *Eriogaster lanestris*, and a discussion took place on the habit of this and other species remaining in the pupal stage more than one season; Mr. J. A. Clark a bred series of *Aleucis pictaria;* Mr. Tutt three specimens of *E. lutulenta* from Sligo, which he suggested might be a species distinct from *lutulenta*, a strongly marked var. of *T. crepuscularia* from Clevedon, and *Halia wavaria* from Wisbech; Mr. Marsden larvæ of *M. artemis* and *B. repandata.* Messrs. Battley and Simes also exhibited lepidoptera, and some preserved larvæ by Mr. Raine. Mr. Marsden exhibited *Otiorhynchus tenebricosus* and *Staphylinus cæsareus;* Messrs. Lewcock and Heasler many species of coleoptera from Loughton, Chattenden, Brockenhurst, and Farnham. Mr. Lewcock read a paper on behalf of Mr. R. Gill of Bath, " On the Coleoptera and Geology of the Bath District."—G. Lewcock and E. Hanes, *Hon. Secs.*

May 1st, 1890, Mr. J. A. Clark, F.E.S., in the chair. Mr. F. Milton exhibited specimens of *Hydrophilus piceus*, *Hydrous caraboides*, and other coleoptera, also the aquatic *Ranatra linearis.* Mr, Clark a series of *E. lutulenta* from the North and West of Ireland, chiefly of the black var. (usually called *luneburgensis*), but one of the slate-coloured variety with a darker central band, Mr. Tutt making some extended remarks on the variation of this species and its distribution; Mr. Quail a very pale coloured cocoon of *S. carpini* (the silk almost white) from Cambridge, a form which appeared to be almost unknown to the members present; Mr. Marsden a pupa of *M. artemis;* Messrs. Raine, Quail, and Simes exhibited excellently preserved lepidopterous larvæ. A discussion on the early appearance of some species also took place.—G. A. Lewcock and E. Hanes, *Hon. Secs.*

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page 7.*)

Before dealing with the peculiarities of the meteorology and physical geography of the British Islands, I should like to quote a remark made by Dr. White (*Ent. Mo. Mag.* iv., p. 248), where he speaks of the peculiarity of the fauna and flora of Western Scotland, although not then referring to variation. He writes :—" No one who has studied the '*Manual*' can have failed to have noticed a great similarity between the fauna in the Lake District of England and that of Rannoch in Scotland. In the Lake District we have a similar elevated region of lakes and mountains, with a like western situation. . . . . Another fact worth noticing about Rannoch is, that while it seems to appropriate to itself most of the Alpine and boreal insects, yet it possesses but few (and these the commonest) Alpine plants; while the neighbouring district of Breadalbane, lying immediately to the south, has more Alpine and boreal plants than any other place in Britain, and yet but few Alpine and boreal insects. Breadalbane, however, has higher mountains and less wood, which may perhaps account for the difference." I would point out how conclusively in this extract Dr. White proves that food has nothing to do with the peculiarity of the Rannoch, or, in a wider sense, the Alpine fauna. Generalising, we find Dr. White again writing :—" Botanists are aware that the plants of the west coast are less brilliantly coloured than those of the east; and I think that it is in the west rather than the north that melanochroism in British insects may best be studied."

The excellence of these observers is beyond question, and the extracts quoted will, I believe, help me to make clear my argument.

I have already given a brief summary of the general meteorological and climatic conditions of the Continent, and shown the limited extent of melanism existing there. I would now turn to our own country and examine its peculiar climatic and meteorological conditions, and compare them with those of the Continent. The following appear to be the chief points to which attention should be directed:—

(1). The first thing that we must notice is the fact that our climate is strictly insular, with an average temperature of 40° to 60° F., with very few extremes of either excessive heat or cold. On the Continent great extremes are registered.[1]

(2). The meteorological conditions of our Islands are governed almost entirely by the influence of the Gulf Stream. This Stream, which is a warm current with an average temperature of 30° F. above the surrounding ocean, is a branch of the Atlantic equatorial current. After passing round the Gulf of Mexico, the Gulf Stream runs round Florida into the Atlantic Ocean, skirts the eastern coast of the United States for some distance, and then strikes off in a north-westerly direction across the Atlantic towards Britain and Scandinavia. As I have stated, its temperature is generally much higher than the surrounding ocean, hence there is always a great deal of vapour rising from it. This vapour, therefore, affects the atmosphere over this current, and renders it moist and humid.

(3). The prevailing winds in Britain are from the south-west. These winds blow over the Gulf Stream; hence in their course they become exceedingly humid, and laden with moisture before they strike our western shores.

(4). The easterly winds, which blow from the icy plains of Siberia, are so extremely cold that almost all the moisture has been condensed before they cross the Continent of Europe. The North Sea is too narrow to modify them to any very great extent; hence they strike on our shores as dry, piercing winds, and thus affect our eastern coast in a contrary direction to the prevailing south-west winds, and so help to counteract and modify the influence of the latter.

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[1] In Keith Johnston's *Physical Geography*, pp. 52 and 53, we find:—"Our climate in the British Isles is a decidedly maritime one; its average temperature ranging from about 40° F. to 60° F. In Central Asia, however, in the same latitude, and at the same height above the sea, the average temperature ranges from about 0° F. in winter to about 70° F. in summer. The temperature of the British Isles surrounded by the sea thus varies only 20° on an average during the year, but that of the centre of the Continent in the same latitude changes to the *extent of 70°*."

Now let us combine Nos. 2 and 3 above. The moisture which has been obtained by the south-west winds in their passage across the Gulf Stream is driven by them over our western shores. The air has to rise to cross our hills and mountains, and falls as rain. As the wind comes on, it loses more and more of its moisture, until, by the time it reaches our eastern shores, the quantity of moisture is comparatively small. Hence we find that the west coasts of our Islands have excessive annual rainfalls—sometimes from 70 to 80 inches—whilst the average of the south coast is less than 20. Not only is the rainfall of our west coasts heavy, but the air is much more humid than that of the east.

But it must not be supposed that the climate of the east coast is not modified at all by the Gulf Stream. The humidity of the air on the east coast is much greater than on the Continent, where the prevailing winds are east or north-east, and even the easterly winds are slightly less dry than when they cross the Continent, as the North Sea, narrow as it is, has some little effect in modifying them in this way.

Summarising the result, we find—(1). That North and North-western Scotland and Ireland are the most humid districts in Britain; Eastern and Southern Scotland, North-western England and Wales following; the Midlands next; and the South and Eastern parts of England least humid of all. (2). That our least humid areas are much more humid than areas in corresponding latitudes on the Continent, and all high-lying areas have a greater rainfall than low-lying areas in the same districts.

I would now direct attention to a few facts relative to the distribution of melanism in this country.

Mr. Percy Russ has shown us that a very great number of remarkable cases occur on the west coast of Ireland. At Sligo a very large number of species are melanic, and probably this is more noticeable among the NOCTUÆ than any other group. The greater part of Ireland is comparatively unworked. Collectors have from time to time stayed at different places, and have at various times compiled lists of the different species that have come under their notice, but this method fails almost entirely in giving us scientific results. The energy of our professional collectors has opened up to us the wonderful melanic *variation* so frequent in the Hebrides and other islands of our western shores, and also those from the Northern Shetlands and Orkneys, where moisture reigns supreme. Professionals and amateurs alike have recorded the variation and general tendency to melanism in the Rannoch district. Abérdeen, Perth, Dundee, and Glasgow have each their own body of active workers, and Lancashire and Yorkshire have long boasted a large proportion of the leading lepidopterists of the United Kingdom, and these have given us an immense mass of information relative to the melanic variation in their various districts. Most of these districts have an exceedingly humid atmosphere, and they produce a greater or less number of melanic forms, but the most intense forms are undoubtedly from the west coast of Ireland, the Scotch Islands and Highlands, where the humidity of the atmosphere is most excessive. There is a great deal of difference between the degree of melanism on the east and west coasts of Scotland. Repeatedly we hear that "the fauna of the east coast is less Alpine than that of the west." With regard to the distribution of melanic forms in Britain, I will again quote Dr. White. He writes:—"That there is frequently a difference between *South* England and Highland examples of the same species, will be admitted, I think, by every one; and that this variation is, in the majority of cases, in the direction of melanism has been generally taken for granted. That it really is so, the following brief analysis[1] of the Highland *Lepidoptera* will show. In it I have compared the majority of the Macro-Lepidoptera of Scotland north of the Tay, with South England (and a few cases with South European) specimens of the same species; for it must be remembered that North and North-western English specimens frequently exhibit the same or even a greater tendency to melanism than the Highland specimens" (*Ent. Mo. Mag.*, vol. xiii., p. 146). Mr. Birchall also in the same volume, p. 131, after referring to the melanism of the Highlands of Scotland, writes:—"It must further be noted that melanic varieties of Lepidoptera occur very commonly in Ireland, the Isle of Man, Durham, South Lancashire, and the West Riding of Yorkshire, under various conditions of climate and soil."

Now to turn from effects to probable causes.

As I have pointed out above, the western coasts of our

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[1] Dr. White (*Ent. Mo. Mag.*, vol. xiii., pp. 145-147) gives a long list of *examples, as also does* Dr. Birchall (vol. xiii., p. 133 of the same journal).

Islands are more humid than the eastern, and the Gulf Stream exerts its greatest influence on the western shores of Ireland, the north-western shores of England and Scotland and the Northern Islands; and here, following out the connection of humidity and melanism, we find that, in those districts, the humidity[1] of which is so striking, we get our most pronounced forms of melanism. The blackness and intensity of colour of certain forms of lepidoptera, especially among the NOCTUÆ from Sligo, Rannoch, the Hebrides, Orkneys and Shetlands are most striking and remarkable, and here are our most humid districts. In a lesser degree the lepidoptera of Eastern and Southern Scotland and North and North-western England show general melanism, but rather less intensity of development in some particular species. Then comes the melanism of Wales and the Midlands; and lastly, the ordinary melanism found in the species of our south and south-eastern districts as compared with the forms of the same species obtained on the Continent. In other words, we find a certain gradation, corresponding, in a general way, with the gradation in humidity.

With regard to the insects on our south and south-eastern coasts, it is rather remarkable that the difference between them and those of the corresponding coasts of the Continent should be so very marked; but it is so, and I am not surprised that Mr. Dobrée (*Entom.* xx., p. 28) should have come to the conclusion that "the inference can be drawn that the melanism is primarily due to the particular geographical position of these islands." To complete the connection between the relation which I have tried to prove exists between "humidity" and "melanism," it would be interesting to know whether the influence of the Gulf Stream makes itself felt sufficiently to produce melanic forms on the western coast of the Scandinavian Peninsula. I know nothing of the fauna of this district; but if melanism occurs there, it would do much to strengthen the view taken.

That this melanism exists in Scandinavia the following note from Professor Schöyen, Christiania, will show:—"The tendency to melanism in our lepidoptera is certainly, as a rule, more apparent on the western shores than in the eastern districts of the country, even at a less height above the sea-level; in some cases this is as marked as in the mountainous tracts,—*e.g.* *Cidaria flavicinctata* occurs at the town Molde in

[1] *i.e.* "*Humidity*" apart from heavy rainfall.

Romsdale Amt, close to the sea-shore, much darker than at Dovrefjeld, about 2,000–3,000 feet above the sea; *Agrotis candelarum* occurs at Bergen as dark as on the Jotünfjelds (var. *jotunensis*, mihi). But in the majority of species, the darker colour is generally found, however, either at a greater height above the sea, viz., on the mountains, or in a more northern latitude. Yet this may also be chiefly caused by the more humid condition of the atmosphere, for the mountains are generally covered with masses of cloud, making the atmosphere much more humid than in the valleys and lowlands, and in the northern latitudes, large quantities of rainfall and fog and mist are prevalent. Under these circumstances the grey colour of many moths will generally be more or less darkened" (*in litt.* 18/3/90). I need not point out how valuable this confirmation of my theory is.

The melanism of Lancashire and Yorkshire deserves to be considered separately. Mr. Dobrée (*Entom.* xx., p. 28), considered the melanism of Yorkshire as "exceptional, and not affecting the general question." Mr. Cockerell, on the other hand (*Entom.* xx., pp. 58, 59), considered that the "melanism of Yorkshire would follow the general rule, and that the melanism of Yorkshire would be found coupled with a greater degree of humidity in those localities where it occurs."

I am inclined to agree partially with both these statements. The melanism of Yorkshire is "exceptional," as many places apparently more humid (because they have a greater rainfall) do not produce such extreme cases of melanism, while there is no doubt that the humidity of the atmosphere in Yorkshire is greater than its rainfall would apparently lead one to suppose it to be. Hence I consider Mr. Dobrée correct in considering it "exceptional, and not affecting the general question;" while there is no doubt that Mr. Cockerell's suggestion is in the main also correct, and that the atmosphere is sufficiently humid to account for a great deal of the melanism which occurs there. But I agree with Mr. Dobrée in considering the melanism of these counties exceptional, for a reason which will appear directly. I have been informed by Mr. Porritt, that "the rainfall of West Yorkshire is about 33 inches, and in Lancashire much the same"; but "the rainfall in Cumberland is much greater; and yet there are not such striking melanic forms, although probably the soil retains the moisture more in Yorkshire" (*in litt.*). If this be so, although the rain*fall of Yorkshire* is less heavy, the general humidity of the air would probably be greater. But some years ago (1877) there was a discussion (*Entom.*, vol. x., pp. 92–96), in which some of our leading lepidopterists took part. With all due respect to the opinion of the others who took part in the discussion, I think Dr. Buchanan White and Mr. Nicholas Cooke (so far as the discussion in the *Entomologist* was concerned) took up the two essentially strong sides of the question. Taking it up from a purely insular point of view, however, neither of these gentlemen appear to have come to any strong or satisfactory conclusions. Dr. White took up the view of "natural selection" and "protection." Mr. Cooke went against the view of "natural selection" (which he seems to have made up his mind was nothing more than a modified form of "sexual selection," although I doubt whether anyone saw it in the light he presented it), and argued that melanism was caused by fumes, etc., acting chemically on the food, and physiologically on the larva. I cannot myself imagine smoke or fumes, by means of food, affecting the organisation of any animal in such a way as to produce melanism, and I doubt whether melanism can be produced or ever has been produced in this way; but combining Dr. White's and Mr. Cooke's theories, I can understand that smoke and fumes would darken the objects in the localities where they are poured out in such excessive quantities, and then by Dr. White's argument of "natural selection" and "protection," I can understand how melanic forms are perpetuated and intensified. Mr. Birchall (*Ent. Mo. Mag.*, vol. xiii., p. 131) took up the view of deficient amount of sunlight owing to the "excessive moisture," as being the exciting cause in Ireland, Scotland and the Isle of Man, and deficient sunlight due to "exhalations from furnaces and chemical works" in manufacturing districts, and further states that "the sun is obscured by the clouds of coal smoke, and the vegetation defiled and destroyed by the deposits of soot." He then argued that having obtained dark forms, "the dark forms have greater strength of constitution, etc., and that the light forms become eliminated." The larva of *Agrotis ripæ* lives underground all day, pupates underground, and yet the imago is often pale ochreous or silvery white in certain localities, never black; yet as far as this argument goes, this species (and all underground feeding larvæ, etc.) should produce specimens which ought to be specially black. Of course, the white colour is in my opinion, due to the pale colour of the sand in the localities where these forms are found, and in which the imago hides by day. But Dr. Chapman (*Ent. Mo. Mag.*, vol. xxv., p. 40), by some observations which he had made, and which he there related, has given us another clue, and opened up a new phase of the question. He suggested that a darkening of the surfaces of trees and similar objects was produced by rain, and hence the darkening of many species might be due to this cause for the purpose of protection. But this appears only to touch the fringe of the question as the surfaces are not made *permanently* darker by rain. How does rain permanently darken the tree-trunks and other objects on which insects rest? It is well known to the most elementary student of chemistry that rainwater rarely occurs pure, and that in large towns the quantity of impurities is very great. The vast quantity of smoke, gases, fumes, etc., in manufacturing towns, brought down by rain, is scarcely credible, and it is from these impurities I consider the permanent darkening comes. When the water evaporates, the solid matter is left behind, and as a result the impurities are left to darken the surfaces to which they have been carried by the rainwater. The theories of "natural selection" and "protection" now apply in their fullest sense, the insects become darkened, "hereditary tendency" perpetuating and intensifying the melanism. I believe from this (and it appears to be a fair deduction), that Lancashire and Yorkshire melanism is the result of the combined action of the "smoke," etc., *plus* humidity, and that the intensity of Yorkshire and Lancashire melanism produced by humidity and smoke, is intensified by "natural selection" and "hereditary tendency." As example I would cite the species *Amphidasys betularia*, *Tephrosia biundularia*, *Boarmia rhomboidaria*, *B. repandata*, *Diurnæa fagella* and *Hibernia marginaria* (*progemmaria*), which, occurring on trees, fences and similar objects would thus be affected. Taking this view, I consider the melanism of these counties "extraordinary;" I also consider it due to "humidity." The melanism of Staffordshire, Derby, and other localities of a similar character, I consider, is produced much in the same way, and the protective melanism of London lepidoptera and of other large towns I would refer to the same cause. Probably no better instance of this kind occurs among London lepidoptera than *Eupithecia rectangulata* var. *nigrosericeata* (another species which in the imago state frequents tree-trunks).

(*To be continued.*)

SCIENTIFIC NOTES.

Trimorphic Colour Variation in certain species.—As is well known, Mr. Frohawk has a white-belted specimen of *Sesia culiciformis*. I find other records in the *Ent. Mo. Mag.*, vol. iv., pp. 153 and 183, of the capture of similar white-belted varieties. The question now arises—Is the coloration of the belt in this species trimorphic or not? Normally the belt is *red*, frequently yellow (var. *thynniformis*), and it is now well known to be occasionally white. The belt then has three forms, red, yellow, and white; but is the white brought about by a real pigmentary change similar to that by which red becomes yellow? Mr. T. D. A. Cockerell writes to me:—"In flowers white is not a pigment at all, but is due to air in the cells; in most animals also white is not a pigment—in fact, Jeffrey Bell, in his *Comp. Anat. and Phys.* (1885), says (p. 271), that no distinctive white pigment is known." That there is a white pigment in certain lepidoptera has been demonstrated. I believe myself that there is no appreciable white pigment in *Pieris*; but that there is pigment in the white of *Lycæna* and *Melanargia* appears almost certain, as they are so readily acted upon by ammonia, etc. Whether the white belt of *S. culiciformis* is of the same nature as these or not requires proof. A case almost on all fours with the belt of *culiciformis* is the collar of *Arctia caia*; normally it is red, in some varieties this and the hind wings are yellow, whilst Mr. Cockerell again writes:—"I suppose you know that our American form (var. *americana*) of *A. caia* has a white collar instead of a red one; and according to Strecker there is in Armenia and Tokat (Asia Minor) a form of *A. caia*, in which the hind wings of the ♂ are pure white, those of the ♀ orange."—J. W. Tutt. *May 18th*, 1890.

Colour of the Blood in Biston hirtaria.—I should like to draw the attention of entomologists to the fact that the colour of the blood differs in the two sexes of *Biston hirtaria*—that of the ♂ being yellow, of the ♀ green. Another curious fact is the frequent occurrence of sacular distension of the blood-vessels, especially towards the hind margins of all the wings. I have never met with this condition in any other insect; possibly other entomologists may have done so. The condition is not perpetuated in the dried insect, owing, I presume, to the complete evaporation of the watery constituent of the blood. What is the cause of this imperfection, and why is it limited to *Biston hirtaria*?—F. J. Buckell, Canonbury Square, N. *April 19th*, 1890.

CURRENT NOTES.

A new British Ichneumon, *Pimpla rufipleura*, has been described by Mr. G. C. Bignell, F.E.S. The species was bred from a batch of cocoons obtained from *Pygæra curtula*.

Mr. B. Blaydes Thompson (one of our Exchange Club members) has gone to the North-West Himalayas to collect the mountain forms of Indian Rhopalocera.

Mr. Porritt, F.L.S., has described the larva of *Catocala fraxini.*

Dr. Wood has written (*E.M.M.*) a first-class life history of the three GRACILARIDÆ (all of which appear to moult twice in the mine and twice after leaving it):—1. *G. populetorum* (which mines in and feeds on birch, and probably *not* on aspen or poplar). 2. *G. elongella* (which mines in and feeds on alder). 3. *G. faclonipennella* (which also mines in and feeds on alder). Dr. Wood seems to think that what is now supposed to be a birch-feeding form of *elongella* may prove a distinct species.

In the *Entomological News* Mr. Cockerell has written a paper "On the Uses of Bright Colours in Hymenoptera."

Our readers will notice that Dr. T. A. Chapman has divided the genus *Acronycta* into three—*Viminia*, *Cuspidia*, and *Bisulcia.*

Notodonta carmelita has been very abundant in Central Europe this spring.

Mr. Gurney exhibited living larvæ of *Geometra smaragdaria* at the City of London Society's meeting on May 15th.

Ocneria dispar has been introduced into Massachusetts. It is proposed to take energetic measures to stamp it out, as it is considered a pest.

I am informed that, owing to the floods, hundreds of females of *Endromis versicolor* have been found drowned this year in one of the large German forests.

The Micro-lepidoptera of Mr. Howard Vaughan's collection were sold on Tuesday, the 20th of May. The species that fetched the highest prices were *C. alpinellus*, 13s. for three; *C. verellus*, 22s. and 28s. each specimen; *C. myellus*, 26s. for two; *C. cassentiniellus*, 45s. for three; *C. rorellus*, 14s. for two; two *C. ocellea*, 24s. and 26s. respectively; *C. argentellus*,[1] 26s.; a lot of eleven containing the two original type specimens of *H. saxicola*, 42s.; one *T. pryerella*, 22s.; another, the original type, 52s. 6d.; a lot containing three *P. adelphella*, 20s.; another with two *P. obductella*, 52s. 6d.; whilst the lots containing *M. anellus* sold for 21s. per lot. Among the TORTRICES *T. semialbana* fetched good prices; the series of *P. cristana* produced £17 7s., one variety alone producing 40s., another 28s. The series of *P. hastiana* produced £6 5s.; two *C. ravulana* brought 21s.; whilst two lots containing *S. deflexana* produced 42s. and 40s. respectively. The principal buyers were Dr. Mason, Messrs. W. H. B. Fletcher, S. Webb, Adams, Farn, Briggs, J. A. Clark, Bird, and Bankes.

The total sum produced by the sale of the Macro-lepidoptera in Mr. Howard Vaughan's collection was above £700; the Micro-lepidoptera (CRAMBIDÆ and TORTRICES) only, produced £120.

The Rev. Canon Fowler, M.A., has added a Coleopteron (*Smicronyx cæcus*, Reich. = *cuscutæ*, Bris.) to the British list, and described it in the *E.M.M.*

Dr. Wood has described the apparatus by means of which some of the *Micropterygidæ* lay their eggs within the substance of the leaf on which the larva feeds. *M. semipurpurella* cuts a pocket in the underside of the leaf, *M. purpurella* on the edge of one of the lateral ribs. The time which these species take to cut a pocket depends on the temperature. In cold weather *purpurella* exceeds 15 minutes, *unimaculella* a little over 9 minutes, whilst in warm weather *semipurpurella* only took 2½ minutes. *Incurvaria muscalella*, which cuts a pocket in the underside of a sloe leaf, Dr. Chapman records, only takes from 10 to 15 seconds. That part of the genus comprising *calthella*, *seppella*, etc., appear to be without this apparatus, and if so will have to be separated generically from those that have it.

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[1] This was taken by Mr. Button, of Gravesend, the gentleman who, some years ago, took *Lythria purpuraria*, *Acidalia strigaria*, and other species, now well known *not to be British*, in Essex and North Kent (*E. M. M.* v., p. 393).—ED.

Lithocolletis betulæ, Z., has been added to the British fauna by Mr. A. F. Griffith, and described in the *E.M.M.* I believe it would be found to be common among birches in Scotland if searched for. It is closely allied to *corylifoliella*, but not glossy.

I understand that the late Professor Frey's collection has been acquired by the British Museum authorities.

VARIATION.

AMPHIDASYS BETULARIA var. DOUBLEDAYARIA.—This is occasionally taken at Wisbech, together with dark forms of a few other species. If the "wet" theory of melanism be true, we can hardly expect to get many black vars. in the Fen-land—the *driest* district in England.—G. BALDING, Wisbech.

HYBERNIA MARGINARIA (PROGEMMARIA) var. FUSCATA.—The dark forms of this species are common here, together with large numbers of the type.—W. MACKMURDO, The Ferns, Wanstead.

I have taken *Hybernia progemmaria* at Chingford, Walthamstow, etc. It is my opinion that this species is certainly getting much darker in these districts, being suffused with black, and losing the light buff colour. Specimens exhibited by Mr. Battley at the City of London Entomological Society's meeting, and taken in North London, were even darker than those I have taken.—J. A. CLARK, London Fields. *April 14th*, 1890.

The dark form of *Hybernia progemmaria* appears to emerge here a little later than the ordinary type. It may have been an accidental coincidence, but the last week this species was out I took four of this form, whilst only one occurred during the three preceding weeks.—G. A. HARKER, Huskisson Road, Liverpool. *May 12th*, 1890.

[This variety seems gradually to be produced in districts where it was formerly quite unknown. It is common, I learn from Mr. Harker, at Liverpool, and it is certainly becoming common in the north-east of the London district.—ED.]

ARGYNNIS AGLAIA var. CHARLOTTA.—With the *Argynnis aglaia* I took last July at Borrodaile, I obtained a fine var. *charlotta*.—W. MACKMURDO, Wanstead.

VARIATION IN ZYGÆNA LONICERÆ.—Mr. Stanger Higgs (*ante*, p. 12) gives an interesting list of the varieties noticed by him in *Z. trifolii*, and as I have during the last nine years had large numbers of *Z. loniceræ*, sometimes as many as 800 in a season, I wish to place on record the varieties of this species which I have noticed :—

1. Upper central spot very large.
2. Two central spots joined.
3. All spots just in contact.
4. Base of posterior wings orange (var. *semi-lutescens*).
5. Right posterior wing with a pale yellowish tinge.
6. Two posterior wings orange (var. *lutescens*).
7. Two anterior wings abnormally narrow.
8. Two anterior wings abnormally broad.
9. Lower central spot very large.
10. Semi-transparent form (var. *eboraceæ*, Prest).
11. Outer or fifth spot very large.
12. Black border of posterior wings narrow.
13. Black border of posterior wings broad.
14. Left posterior wing with colour of anterior, viz., a bluish bronze with the usual red spots.
15. Anterior wings greenish instead of bluish.

—W. HEWETT, York.

PYRAMEIS CARDUI var. MINOR.—This form (hardly to be called a variety) was indicated from high altitudes in *Canad. Entom.*, 1890, 57, but the first specimen I found was near Ula, Custer Co., Colorado, 7,670 ft. altitude, on the morning of June 26th, 1889. The wing expanse of this small specimen is only about 42 mm. If my memory serves me rightly there is a British example of this var. *minor* in the British Museum collection.—T. D. A. COCKERELL, West Cliff, Colorado, U.S.A. *March*, 1890.

AMERICAN VARIETIES OF BRITISH LEPIDOPTERA.—The notes of mine which have appeared in the first number of the *Entomologist's Record* were written some time ago, and I could now add very considerably to them, while one or two statements may be amended. Thus *Alucita montana*, which has never been described, is a synonym of *hexadactyla*, on the best of authority. *Parnassius smintheus* belongs with *delius* rather than *apollo;* in fact, Mr. Elwes regards it as a variety of *delius*. However, *delius* feeds on saxifrage, while the larva of *smintheus*, recently discovered by Mr. Bruce, feeds on *Sedum stenopetalum*, and I believe is not like that of *delius*, but we shall no doubt have this matter cleared up by Mr. W. H. Edwards in due course. Mr. Edwards wrote me on July 25, 1889, that if Zeller is right in saying that *delius* larva is just like *apollo*, then *smintheus* is distinct, for the *smintheus* larvæ have lemon-chrome spots. It may be worth while to continue the list given on pp. 13, 14 of American varieties of British species. The following are found in America :—

Pamphila comma, L. var. *catena* Staud. is recorded from Labrador. *P. colorado*, Scud. has been regarded as a variety of *comma*, and under it falls a var. *idaho*, Edw.

Cœnonympha typhon, Rott. var.? See Skinner, *Canad. Ent.*, 1889, p. 240.

Danais plexippus, L. var. *fumosus*, Hulst. Deep sooty brown taking the place of bright fulvous.

Pieris rapæ var. *immaculata*, Skinner and Aaron. (= *immaculata* Ckll. nom. ant.) Described recently in *Canadian Entomologist*.

Arctia caia v. *americana* is the usual American form of the species. Mr. Hy. Edwards has described a var. *utahensis*.

Hydræcia nictitans vars. *erythrostigma* and *lucens* are known in America. I have found *erythrostigma* by Willow Creek, Custer Co., Colorado.—T. D. A. Cockerell. *April 28th*, 1890.

NOTES ON COLLECTING, Etc.

Neuroptera and Trichoptera.—I have had several letters about how best to study these groups. Mr. Porritt writes to me:—"There is no book on the Neuroptera, but Dr. Hagen's papers in the *Annual* for 1857 (published by Messrs. Gurney & Jackson, 1, Paternoster Row, E.C., I believe for only 2s. 6d.) are most useful. The *Ent. Mo. Mag.* (by the same publishers) for 1872–73, (vol. ix.) contains a splendid paper on collecting, etc., with a general survey of all the sections of the Neuroptera and Trichoptera by Mr. McLachlan, which is most useful to beginners. As for the Trichoptera, there is nothing at all to approach Mr. McLachlan's book, which has carefully executed figures of the neuration, appendages, etc., of *all the known* European species" (*in litt.*). I also understand that Mr. W. Harcourt Bath has in the press an *Illustrated Handbook of British Dragonflies*, which will contain a full description of every species indigenous to the British Isles, besides other interesting matter. It will be published by the Naturalists' Publishing Company, Birmingham.—J. W. Tutt.

Spring Notes.—I have found insects rather scarce here this season. In January I took a good series of *P. pilosaria* (including one very nice dark var.), but since then the prevailing wind has been north-east, and few things have been seen. In the absence of a livelier occupation I have employed my spare time in digging for pupæ of *Hypsipetes ruberata*, which has been fairly profitable.—G. Balding, Wisbech.

So far the season in the South seems forward, but I have had little time for work. *Boarmia cinctaria* were very abundant on May 6th in the New Forest, and on May 1st *Saturnia carpini* were flying, too fast, however, to capture. I only saw 2 *Lycæna argiolus* and 1 *S. alveolus*; *Fidonia atomaria* were out in some abundance, also *Satyrus egeria*. I took a few larvæ of *Cleora lichenaria*, and plenty of small *M. oxyacanthæ*. In an unheated conservatory I have bred the following:—*Arctia mendica*, in plenty (the ♂'s curiously enough being often deformed); the ova were laid on May 2nd, 1889, emerged June 5th (fed on groundsel), and spun up in about a month; *Selenia lunaria*, from ova obtained from Mr. Tunaley; *Hadena thalassina*, ova from female taken June 3rd, 1889, hatched June 10th, fed on groundsel and buried about July 24th; *Nemeobius lucina*, ova June 2nd, hatched June 14th, and pupated on July 27th. This species is very easy to breed: place a bell glass over a primrose root, put some ♀'s underneath, and leave them alone. *Smerinthus tiliæ*, ova May 10th, hatched June 20th, sleeved out on elm and fed well (55 of them), buried July 20th, and onwards; *Orgyia pudibunda*, larvæ in October on the elms. I have also been successful so far with *Toxocampa pastinum*. I received ova from Herefordshire, laid on July 6th, hatched July 16th, hibernated on the stems of purple vetch, began to clamour for food on March 27th, and would eat nothing but the purple vetch which was just showing. However, I managed to satisfy their demands, and they are now doing well. *Thera variata* (*obeliscata*), larvæ April 7th, 1890, pupated April 22nd. Imagines of *H. abruptaria* and *O. bidentata* have been taken (a full week earlier than last year). *Callimorpha dominula* larvæ have spun up under the leaves resting on the ground. *Ellopia fasciaria* larvæ are just turning, but I have not taken many.—(Rev.) G. M. A. HEWETT, The College, Winchester. *May 10th*, 1890.

Whilst at Hereford (during the first week in April) I was struck by the sight of some stacks of hop-poles by the road side, freshly cut, consisting principally of sallow and alder, of which a large proportion were tunnelled and then inhabited by the larvæ of *Sesia bembeciformis.* Many were inhabited by two and even three larvæ.—A. J. HODGES, Highbury Place, N.

I have been unable to get out, but have had the following species brought me:—*Lobophora lobulata*, *Larentia salicata*, several *Odon. bidentata* and *Cidaria suffumata* (both dark and light forms), some good *Melanippe fluctuata.* var. *Neapolisata;* also a few larvæ of *Melitæa artemis* and *Agrotis pyrophila.*—W. REID, Pitcaple, Aberdeen, N.B. *May 10th*, 1890.

Very little seems to be stirring just now. I took *Tephrosia biundularia* (ten days earlier than usual), with *Pararge egeria*, *Pieris napi*, *Euchlöe cardamines*, and *Plat. unguicula* on the 1st; *Teph. biundularia*, *T. crepuscularia* (the first time I have seen both species on the same day at the same place—at Pangbourne), *T. consonaria*, *Notod. camelina*, and *Strenia clathrata* on the 2nd; *Eup. vulgata*, *Hem. abruptaria*, and *T. biundularia* on the 3rd; *Cidaria suffumata* (almost black) and *Cor. unidentaria* on the 4th; *Eup. lariciata* on the 5th; *Cor. ferrugata*, *Plat. unguicula* and larvæ of *Aciptilia galactodactylus* on the 6th; *Notodonta chaonia*, *Sphinx populi*, *Orgyia pudibunda*, and *Eup. vulgata* on the 7th; *Aglossa pinguinalis* on the 8th; *Notodonta chaonia* and *dromedarius* to-night (the 10th). The latter emergences, I think, rather point to an early season.—R. B. ROBERTON, Greenwood House, Calcot, Reading. *May 10th*, 1890.

I have already been at work, searching the birches for *Asphalia flavicornis* at Rixton Moss, but without success. A friend who was with me was more fortunate, and secured three examples at rest on birch twigs and another on heather. On April 6th we "sugared," in the hope of inducing *A. flavicornis* to its attractions, the night being all that could be desired—from our idea of a favourable night—but of no avail. *Tæniocampa incerta*, *stabilis*, and *gothica*, however, came, as also *Cerastis vaccinii*, but these were only observed in the maturer parts of the woods, where last year's bracken fronds formed a thick undergrowth, and suggested a probable hybernaculum for this species.—J. COLLINS, Warrington. *April 10th*, 1890.

The last month has been most changeable, frosty, and much rain. I have taken but few insects, and they have been mostly captured at flowers of *Berberis* in my garden (sugar being fruitless). Those taken so far are:—*Tephrosia crepuscularia*, *Hybernia progemmaria*, *Diurnaæ fagella*, *Anticlea derivata* and *Trachea piniperda.*—T. W. KING, Purbrook, Dorking. *April*, 1890.

I took *Notodonta ziczac* on April 23rd, and have already (May 1st) seen several *D. vinula*—T. Baxter, St. Anne's-on-Sea, Preston.

You will perhaps be interested to know that I took *Eubolia lineolata (virgata)* from the Cheshire sandhills on the 12th inst., which is very early.—T. Tunstall, Warrington. *April 22nd*, 1890.

Having found *Hybernia progemmaria* abundant here at the end of January and during February, I was surprised at taking a male at Dawlish on the 17th inst. On the 4th I saw two specimens of *Pararge egeria.*—R. M. Prideaux, 9, Vyvyan Terrace, Clifton, Bristol. *April 23rd*, 1890.

Biston hirtaria has been unusually abundant in London this month. One afternoon, in three-quarters of an hour, I took fifty-four in the heart of the City, and a friend who was with me took nearly as many. They were all quite recently emerged.—C. Fenn, Eversden House, Burnt Ash Hill, Lee, S.E. *April 26th*, 1890.

Tæniocampa gothica has been the only species of the group even tolerably abundant here this spring; we have had a long succession of cold nights, with unusually severe frosts on several occasions, and with the exception of three or four evenings the wind has been north-east for the last month. Imagines have been seldom seen on the wing, but hybernating larvæ have been particularly numerous, especially on primrose and arum.—J. Mason.

Tephrosia crepuscularia has been rather plentiful this month (April), and a few good varieties have been taken, one of which is even more distinctly marked than the specimen[1] just returned in the Exhibition box. These vars. I only find in one locality, and, strange to say, are all females. I have never seen any specimens of the second brood vary either in colour or markings, as in the first brood; almost all are light coloured, the markings indistinct, the specimens much smaller and less plentiful. The locality where I take the species is situated on very high ground, facing north; the plantation is a mixed one, larch and Scotch fir predominating, with a sprinkling of oak; the undergrowth is chiefly elder and hazel; the soil is a sandy loam, overlying the Pennant limestone. In confinement I find the larvæ feed freely on sloe and plum.—J. Mason.

I bred a batch of *P. tersata* the last week in March. The larvæ were fed up last autumn; one of the females has produced a few ova, which I hope will prove fertile, as it appears to me possible to rear three broods in the twelve months. I may mention that the pupæ have in no way been forced, the breeding case having been out of doors since February.—J. Mason, Clevedon Court Lodge, Somerset.

I saw a specimen of *Melitæa cinxia* to-day, but several larvæ were still feeding on the cliffs. Some of my larvæ pupated a week ago. *Thecla rubi* seems to be unusually abundant here this spring.—W. A. Luff, Guernsey. *May 17th*, 1890.

I have spent three afternoons on our moors in obtaining mines of *Lithocolletis vacciniella* and *Nepticula weaveri*. The latter species requires a lot of finding. The *Nepticula* mines the upper side of the leaves, the *Lithocolletis* the underside.—J. Batty, Sheffield. *May 27th*, 1890.

Owing to the easterly wind my captures up to date have been very few.

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[1] This was a beautiful variety, with the outer area of the fore wings dark ochreous brown, but with *very distinct lines.*—Ed.

I have taken some nice *Lobophora lobulata* during the last week, but sallows this year have been quite a failure.—S. WALKER, York. *April 29th.*

I spent a couple of days at Easter in a wood near here. *Brephos parthenias* was fairly common, but so extremely difficult to catch I only obtained about half a dozen specimens. I found the best time to catch them was about 4 p.m., as they then appeared to fly lower than at any other time. They first appear about 10 a.m., but then fly high among the tops of the birches, occasionally, however, settling on the partially withered sallow blossoms.—A. E. HALL, Sheffield. *May 1st.*

Brephos parthenias is plentiful here among birch, but its wild flight and the height at which it flies makes it by no means easy to take. I find it advisable to keep out of sight, for by concealing myself and sallying out at such specimens as appeared to be low enough to render their capture possible, I secured some dozen and a half specimens on one occasion. They are more readily obtained by beating the boughs in cloudy weather.—E. A. ATMORE, King's Lynn. *May 9th.*

Mr. Milne and myself have been very successful with the larvæ of *Retinia resinana.* Both of us have filled our bags this afternoon with fir twigs containing the larvæ. This species does not appear to be found in the immediate vicinity of Aberdeen, our larvæ having been obtained some miles out.—A. HORNE, Aberdeen. *May 27th,* 1890.

I was on the *Phorodesma smaragdaria* ground a few days ago, but found the foodplant (*Artemisia maritima*) buried quite 2 feet under the drift left by the late high tides. It is curious how the larvæ of this species get through their hybernation, as, during the winter, they must be covered by every high tide. There is no possible escape for them. —J. A. COOPER, Leytonstone. *April 24th,* 1890.

Captain Robertson sent me a long series of living *Pancalia lleuwenhœckella* on May 15th, and another of *Micropteryx calthella* on May 22nd, both very early dates. I bred *Platyptilia gonodactyla* to-day (May 24th). This is the earliest date I know of.—J. W. TUTT, Westcombe Hill, S.E.

A day at Chiselhurst on May 24th showed that very few Macro-lepidoptera appeared to be stirring:—

Lycæna argiolus, *Arctia mendica*, *Macraria notata*, *Cabera pusaria*, *Fidonia atomaria*, *F. piniaria*, *Eupithecia satyrata*, *Panagria petraria* being almost the only species seen. Among the TORTRICES, however, *Phoxopteryx uncana* and *Phlœodes tetraquetrana* were well out among the birches, and the so-long rare *Phoxopteryx upupana* was not uncommon around the tops of the oaks and birches, but almost impossible to catch without a long-handled net. With the exception of *Gelechia ericetella*, I saw scarcely any of the TINEINA. The larvæ of *C. boreata* and *H. aurantiaria* were very abundant. May 26th was spent with Mr. Hope Alderson in the district about Shoreham in Kent, and the results were rather disappointing. The Macros seen were of the very commonest, comprising *Euchlöe cardamines*, *T. tages*, *L. alexis*, *Eup. satyrata*, *E. subumbrata*, *Cor. propugnata*, *C. ferrugata*, *M. subtristata*, *Asthena candidata*, *Euclidia glyphica*, and *Phytometra ænea.* TORTRICES were almost entirely absent, and among the TINEINA large numbers of *Glyphipteryx fuscoviridella*, *G. fischeriella* and *Elachista triatomella* alone were noticeable. A few hours on May 27th was spent in the neighbourhood of Strood, Kent, sufficiently long to show that *Corycia taminata*, *C. temerata*, *Cabera pusaria*, *C. exanthemaria*, *Ephyra omicronaria*, *Asthena candidata*, *Strenia clathrata*, *Eupithecia castigata*, *E. plumbeolata*, *Melanthia ocellata*, *Coremia ferrugata*, and *Cidaria corylata* were well out. *Phoxopteryx diminutana*, too, occurred with *Argyrotoxa conwayana*, *Capua favillaceana*, and lots of *Cnephasia musculana*. No TINEINA worth mentioning were in evidence, except *Nemophora schwarziella*, *Incurvaria masculella*, and equally common species. May 28th found me at Deal, but an evening on the sandhills produced nothing better than a few *Aspilates citraria*, *Eubolia lineolata* (*virgata*), *Phibalapteryx lignata* (one only), with *Gelechia desertella* well out, and *G. diffinis* just appearing. Among the NOCTUÆ only *Apamea basilinea* and *Leucania comma* put in an appearance. May 29th at Kingsdown and St. Margaret's Bay produced the best results of the week—among the smaller fry of course—the only larger species at all visible being *Melanthia ocellata*, *Melanippe galiata*, *Eupithecia centaureata* and *Camptogramma bilineata*, (a very early date); but among the smaller things were an abundance of *Dichrorhampha plumbana* and *D. plumbagana*, and *Pterophorus microdactylus* (among *Eupatorium cannabinum*). Other species noticed were *Argyrolepia subbaumanniana*, *Chrosis tesserana*, *Xanthosetia hamana*, *Eupœcilia dubitana*, *E. atricapitana*, *Crambus prœtellus*, an abundance of *Glyphipteryx fischeriella*, a few *Adela fibulella* and several *Pyrausta punicealis*. Friday was a blank—wet and comparatively cold, and I spent the day "setting"—but on Saturday I worked along the coast from Deal to Dover and found all Thursday's species again, with *Scoparia dubitalis* var. *ingratella* already out, an occasional *Phytometra ænea*, *Gracillaria tringipennella*, etc., and one *Lycæna alsus*. Before closing this note, I should like to place on record the great abundance of *Pieris brassicæ* and *P. rapæ*. They appear in large numbers everywhere throughout Kent. I counted above 100 between Wye and Ashford railway stations on Sunday morning. They were equally numerous all the way up, and are especially abundant in the S.E. (London) district.—J. W. TUTT. *June 2nd*, 1890.

I captured a fine *Stauropus fagi* (female) on a beech trunk near Reading, on May 27th. It had apparently just emerged from pupa. Another was taken in the same woods the day previous.—(Mrs.) E. BAZETT, Springfield, Reading. *June 3rd*, 1890.

Last week I bred a fine ♂ *Cerura bicuspis* from a pupa found here last winter.—T. A. CHAPMAN, Hereford. *May 28th*, 1890.

HABITS OF TORTRIX FORSTERANA (ADJUNCTANA).—Referring to my previous note on this species (*ante*, pp. 45, 46), I would add, that when the larva is nearly full fed, it leaves its old home, rolls up one or more ivy leaves, and pupates in the fresh green leaves of the ivy, or any other plant. Any one, therefore, who collected the old conspicuous bunches (in which the larvæ feed before they are full fed) for pupæ, would, I am afraid, get but a small number of pupæ for their pains. Probably this habit of wandering from its food to pupate has been the means of other plants being designated as its food. I have pupæ in leaves of *Tussilago farfara*, mint, Virginian creeper, honeysuckle, rose, etc.—J. W. TUTT. *May, 18th*, 1890.

I have taken the larvæ of *Tortrix forsterana* for many years on ivy in the garden here; but never remember seeing it more plentiful than this; it is simply swarming on all the ivy we have, which is considerable. I thought this insect was everywhere abundant, but if not, and anyone desires it, will do my best for them. The imago is always much rarer than the larvæ.—A. E. HALL, Norbury, Sheffield. *May*, 1890.

PEACH AND NECTARINE BLIGHT.—I should be much obliged if anyone can tell me the cause of the leaves of peach and nectarine trees becoming blighted yearly at this season. It seems to be due to *Aphis* attack; but I have never succeeded in detecting the insects causing the mischief.—JOSEPH ANDERSON, JR.

[I am inclined to believe this is due to imperfect nutrition or root action, but comments are invited from correspondents.—ED.]

KILLING INSECTS.—I captured, last Wednesday, a specimen of *Libellula depressa*, drying its wings on a grass stem. On reaching home I put it in a killing bottle, which I had prepared myself a fortnight before. About an hour afterwards I opened the bottle again to put in a specimen of *Rumia cratægata*, and was surprised to find *depressa* still alive, especially as I was sure the bottle was a very strong one, so I timed the specimen of *cratægata*, and it was quite dead in 25 seconds from the time I put it in. Could any of the readers of the *Entomologist's Record* tell if all the genus *Libellula* are so tenacious of life or would its recent emergence in any way account for it?

I can fully corroborate Mr. Raynor's statement in his paper on "Killing Lepidoptera," with regard to the effects of potassium cyanide fumes in relaxing insects, for I left my specimen of *L. depressa* in the bottle for 48 hours, and when I then took it out to set, it could not have been in a better condition.—D. H. S. STEUART, Radley College, Oxford. *May 18th*, 1890.

Last month I mentioned that I always killed my specimens with strong liquid ammonia, and one advantage of this over cyanide of potassium, has just presented itself to me. On April 26th I took 7 specimens of *Biston hirtaria*, and killed them with ammonia. These were ready to come off the boards in a week. Mr. Hodges gave me a dozen or more specimens killed the same day with cyanide of potassium. Some of these are not dry yet, although almost a month has elapsed. This would be a serious matter in the summer time when one's setting boards are wanted.

I have had several letters from well-known lepidopterists saying that they have used zinc boxes for many years, and have never had mould in their collections. The writers must forgive me for not printing these letters *in extenso*, but with the exception of suggestions that insufficient drying before removing from setting boards, placing cabinets, etc., a few inches only from an outside wall of the house, and having the cabinets not standing free from the ground for some inches, are the most fruitful causes of mould, there is nothing of importance to the general reader.—J. W. TUTT. *May 26th*, 1890.

REARING LASIOCAMPA QUERCIFOLIA.—I bred this species some few years ago from the egg, and kept my larvæ outside, but sheltered from the rain. They were kept in an ordinary breeding cage and the larvæ lay along the dry twigs of the hawthorn. During the winter I lost very few, but the greatest mortality occurred when they were full fed. Just before changing to a pupa, many emitted a quantity of strong smelling liquid, and this appeared to accompany, if it were not the real cause of death. This I think could have been obviated, by allowing them more space, but this suggested itself to me when too late.—A. W. Mera, Capel Villas, Forest Gate, E.

Assembling with Stauropus fagi.—At the present time the above Prominent has become very scarce in our woods, and it seems opportune to record an experience of past years, which first taught me that there were more of this species in a wood than might be imagined. It was about the end of June, when a party of four started about 10 p.m. to a neighbouring wood, carrying a ♀ *fagi* with us, which had emerged the *previous* evening. We knew that an elevated spot, in fact, the ridge of the hill, was most favourable for the sport, and that the time of flight was from a little before 11 p.m. till a little after 12. After reaching an open space in the wood and where three roads met, we hung the muslin cage, with the moth asleep in it, on the branch of an oak, about 4 feet from the ground, lighted our lanthorn, and stood ready, two of us with nets, and a third attending to a large killing glass with freshly-bruised laurels, and to the lanthorn. I feared we were too early in the season, for pupæ kept indoors are generally earlier in coming out than those in the woods. Still the night was warm and still, which was in our favour, for in a cold night *fagi* will not stir. Our doubts were soon solved, for about 11 o'clock a ♂ came flying past the cage rapidly, and after two or three turns allowed himself to be netted. The end of the net was then lowered into the killing-glass, and his fluttering soon ceased. We took about half-a-dozen, and saw perhaps two dozen. One was admitted into the cage, but, strange to say, immediately became quiet, for this insect is very difficult to pair in confinement. This night's experience was enough to convince us that *fagi* was more plentiful in the woods than is commonly supposed. Where they hide during the day is a mystery; possibly among the higher branches of the trees or among the brushwood, as I rather suspect. Wet seasons seem favourable to this insect. In the wet seasons, about 1860 and 1861, so fatal to most species, I took more larvæ of this species than ever before or since.—(Rev.) B. Smith, Marlow. *April 23rd.*

Foodplant of Eupithecia extensaria.—The Rev. J. Seymour St. John, in his recent useful publication, gives *Artemisia absynthium* as the foodplant of *E. extensaria.* Here, however, it feeds on *A. maritima.*—E. A. Atmore, King's Lynn.

Clostera anachoreta.—It may be advisable to put the following fact on record:—In the year 1862 I captured a specimen of *Clostera anachoreta* sitting on a paling at Downton, near Salisbury. This is the only capture I ever made of the species.—T. W. King, Purbrook, Dorking.

Mines of Lithocolletis klemannella.—Can any one give me an idea what the mine of *L. klemannella* is like? I am acquainted with the long mines of *L. frolichiella* which are to be found on the under sides of alder leaves, sometimes as many as 4 mines (all tenanted by larvæ) are to be found in one leaf. I am also familiar with the mines of *L. alnifoliella* and *L. stettinella.* Having occasionally bred a specimen of *L. klemannella,* I am curious to know the form of its mine so as to be able to identify it. —E. ATMORE, King's Lynn.

THE DIANTHŒCIÆ AT HOWTH.—The *Dianthœciæ* will occasionally come to light, but I think the only practical way to take them is to stand and patiently watch, gazing intently at a clump of *Silene maritima.* Sometimes one watches an hour or so (letting *Acidalia marginepuncta, A. bisetata,* etc., fly away, lest *Barrettii* should be missed by having the net otherwise engaged) before one sees in the dim light something almost invisible, close to the flowers, and a rapid stroke making sure of the prize, discloses generally that the capture is *D. capsophila.* However, I captured a few *Barrettii* last year, but not very fine specimens. The flight of these insects sometimes does not come at all, and generally, when it does come, does not last for more than a quarter of an hour or so.—G. V. HART, 14, Lower Pembroke Street, Dublin.

NOTES ON XANTHIA CERAGO AND X. SILAGO.—In the September of 1888, noticing the complete absence of the *Xanthias* from my sugared trees, I began searching flower-heads, etc., and found to my great astonishment that the two common species mentioned above seemed to prefer the dry-looking feathery heads of the very pretty long grasses, which are to be found in most clearings in woods, and which, in the spot I was working, were especially luxuriant—some of the stronger stems reaching a height of about 4 feet. *Silago* was the more plentiful, and could have been taken by scores, sometimes as many as four on a single head, and were easily boxed. *Cerago* was far less abundant, and the only other moths I found at the same heads were, if my memory serves me, one *Hydrœcia micacea,* and a few *P. meticulosa.* Last autumn I was upon the ground at about the same time, but I saw no traces of either species on the grass; indeed, the only specimen I saw at all was a single *silago* beaten out by chance in the afternoon.—A. J. HODGES, 2, Highbury Place, N. *May,* 1890.

It is usual for me to collect both *X. silago* and *X. cerago* imagines on "sallow" leaves, feeding on the honeydew which is on them, and they are more especially abundant on dewy evenings. In the district I work, the trees I "sugar" are parallel with a row of good sallow bushes, a half mile in length, to which, when the sugar has failed, I have devoted my attention with considerable success—especially on evenings following a fine day—when such species as *Leucania lithargyria, L. pallens, L. impura, Apamea fibrosa, Noctua baja, N. augur, Triphœna comes,* besides hosts of *A. didyma* (*oculea*) and *N. xanthographa* may be taken.—J. COLLINS, Lilford Street, Warrington.

I took large numbers of *X. cerago* on sallow leaves during "foggy" evenings last August. I should like to have known of it some years ago, but only found it out in 1888, when, having travelled to Moreton, 12 miles from here, to sugar on the heath, a fog came on, my sugar was unproductive, and I was anything but satisfied with my evening's sport, until I found *cerago* and *silago* on the "sallow" leaves, although I must own I have never found any other species there. It is only as a last hope that I search the bushes,in fact I should probably not go out if I thought I should be driven to that extremity. I have a fine dark-banded *cerago* taken in that way.— A. FORSYTH, Weymouth.

[This variety of *cerago* is especially fine, with a complete rich red band across the centre of the wing. It has been exhibited in one of the baskets of the Exchange Club.—ED.]

UNPRODUCTIVE SUGARING.—I took a fine dark variety (♀) of *Agrotis lunigera* here on ragwort in August, 1889. I find searching the ragwort shortly after dusk, say from 9 to 10.30 p.m., more productive at Howth than any other mode of capturing NOCTUÆ (imagines) at that time of year. For the time sugaring becomes almost useless. Of course one is greatly troubled with *A. didyma* (*oculea*) and *N. xanthographa*. Geometers also come to the ragwort, but are not so easily boxed.—G. V. HART, Lower Pembroke Street, Dublin.

On the question of "unproductive sugaring," last August, night after night, I tried several localities in West Somerset, and at last gave it up in disgust, and searched the flowers. Of these, none were so productive as those of the common heath, although ragwort, St. John's wort, and golden rod gave satisfactory results. It was while working in this way that I found *Gonopteryx libatrix* feeding on over-ripe blackberries; every night I went to the same brambles on a small patch facing the sea, and was certain to find them; so overgorged were they, that they dropped like leeches into the chip boxes, which when opened were frequently found much stained with the ejections of blackberry juice. *Noctua dahlii* was common on the heath blossom, but, unfortunately, I was too late to get them in fine condition. The blackberry blossoms were also attractive, and swarmed with *Triphæna janthina*.—H. TUNALEY, Erdington Hall, Birmingham.

[I found, last August, in the Isle of Wight, that, though practically nothing came to sugar, yet the flower heads of *Eupatorium cannabinum* produced large numbers of many NOCTUÆ and some few Geometers.—ED.]

AGROTIS AGATHINA IN THE MIDLANDS.—I took a larva of *A. agathina* on May 22nd, 1889, in Sutton Woods. Three days afterwards it went down, and the imago emerged at the end of July. As the above locality is in the heart of the Midlands, I should like to know if there is any other record of its capture so far inland, or whether the form differs from those usually taken.—H. TUNALEY, Birmingham.

[The specimen is much like those obtained at Shirley by Mr. Sheldon. It is paler than the Perthshire specimens, but quite as large and bright.—ED.]

NOTES ON BISTON HIRTARIA.—The observations of Mr. Alderson, in his interesting note in the *Entomologist's Record*, p. 18, with regard to the pairing of *Amphidasys strataria* (*prodromaria*), are fully borne out by my experience of the kindred insect, *Biston hirtaria*. The imagoes of this species emerge about noon, pairing takes place the same night, and the sexes remain *in cop.* until the afternoon of the following day.—F. J. BUCKELL, Canonbury Square, N.

EUPITHECIÆ IN SURREY.—During the past year or two I have devoted some attention to this interesting group, and have found no difficulty in procuring many species in this district; where no locality is given in the below-mentioned species the one meant is Croydon. *Eupithecia venosata*, larvæ and imago common; *E. linariata*, larvæ common some years, totally absent others; *E. pulchellata*, larvæ very common at Leith Hill; *E. oblongata*, larvæ not uncommon on *Pimpinella saxifraga ; E. succenturiata*, one specimen only at present; *E. subfulvata*, larvæ very common; E. *scabiosata*, to be beaten commonly from yew trees in June at Boxhill; *E. isogrammata*, in countless millions; *E. satyrata*, the remark about *E. scabiosata*, applies to this species also; *E. castigata*, very common; *E. trisignata*, larvæ very common at Boxhill in September, feeding on *Pastinaca sativa* (wild parsnip); *E. pimpinellata*, larvæ very common; *E. pusillata*, not uncommon amongst spruce in May, West Wickham; *E. indigata*, scarce amongst Scotch fir, West Wickham; *E. nanata*, very common at Shirley, there is a second brood of this species flying in August; *E. vulgata*, very common; *E. albipunctata*, larvæ in September at Boxhill and near Caterham, feeding on *Pastinaca sativa* and *Angelica sylvestris ; E. expallidata*, larvæ local and not common; *E. absynthiata*, common; *E. munitata*, Shirley, common; *E. assimilata*, in my garden on hops, common; *E. subciliata*, Boxhill, rare; *E. lariciata*, West Wickham, not common; *E. abbreviata*, frequent; *E. exiguata*, common; *E. sobrinata*, common amongst juniper; *E. pumilata*, common; *E. coronata*, rare; *E. rectangulata*, not common.—W. G. SHELDON, Croydon. *March 12th*, 1890.

NOTES ON DASYDIA OBFUSCATA.—Whether viewed simply from a collector's point of view, or considered in more scientific aspects, I have not come across any insect more interesting in its habits than *D. obfuscata.* According to my experience it is extremely local, but if looked for at the right time in its special haunts not by any means rare. One may, however, collect for years over ground precisely similar to and within a very short distance of spots where it occurs commonly every season without being able to find a single specimen. It frequents rough heath-covered ground at a moderate elevation, where there is abundance of bare rocks cropping up here and there. On these the moths rest during the day, with wings spread fully out, in which position their strong protective resemblance to the stone cannot fail to strike any one seeing them *in situ*, the difficulty indeed being to see them at all. In colouring the species varies very considerably from light granite grey, in which the appearance of the rock, where it is bare and clear, is very closely imitated, to a dark leaden form, almost indistinguishable from a lichen growing plentifully on the rocks, the resemblance being heightened by the rounded wavy lines on the wings corresponding to the outlines of the lichen. When disturbed from its resting place, after the first fright (and flight) is over, the insect invariably makes its way to the nearest rock, not by flying, but by walking or running along, using its wings as aids, in the manner of an ostrich. It seems to have a very special aversion to being "blown upon," not only keeping to the lee side of the rock, but creeping in to the shelter of any overhanging part, always provided there be a flat surface on which to spread out the wings. In the course of collecting in one special locality which the species frequents, I have come to know one or two corners, forming miniature caves, where, if there has been any wind at all during the previous night, I can almost certainly reckon on finding several. I remember on one occasion turning out no less *than nine* from a retreat of this kind of such limited space that there was no room for the whole without the extended wings overlapping. By dint of caution I succeeded in boxing the lot one by one without the aid of the net, they being very averse to leave such comfortable quarters.—T. J. HENDERSON, Glasgow.

PRACTICAL HINTS.

By C. FENN, F.E.S.

(*a*) June (middle). Larvæ of *Spil. aceriana* may now be collected. They feed in the terminal buds of poplars and aspens. The presence of the larva is indicated by a tube of frass projecting from the end. Insert the cut twigs in damp sand.

(*b*) June (middle) to July (middle). *T. amataria* may now be taken in abundance flying at dusk in weedy lanes; and after dark at rest on the grasses and hedge plants.

(*c*) June (on to end). *Phorodesma bajularia* flies high at *sunset* in oak woods; prefers broad rides and woodsides.

(*d*) June (end). *Tortrix branderiana* may be obtained freely, flying high from sunset to dark over the tops of aspens in woods.

(*e*) June (end). Larvæ of *C. chamomillæ* are now nearly full fed on *Matricaria*. Search for them in the morning sun on the plants.

(*f*) June (middle to end). *E. gallicolana* is now out, flying swiftly over the tops of oak trees and bushes, from 2 till 7 p.m.

[*N.B.*—The PRACTICAL HINTS for July will be written by Mr. W. H. Tugwell.—ED.]

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —*May* 15*th*, 1890, Mr. J. A. Clark, President, in the chair. Mr. Bellamy exhibited specimens of *D. pulchella*, from India, the insects being rather smaller and more heavily marked than the English form; Mr. Tutt a fine variety of *S. clathrata*, from Winchester; a melanic form of *C. immanata*, from Warrington, and some large specimens of *M. artemis*; Mr. Clark dark specimens of *X. poloyodon* and *H. micacea*, also very strongly-marked specimens of *A. lubricipeda*, from Germany; Mr. Simes a variety of the larva of *C. caja*, the hairs at the side being black instead of red, the larva thus being quite black; Mr. Gurney larvæ of *P. smaragdaria*; Mr. Milton series of *Dytiscus marginalis* and *D. circumflexus*. Mr. Clark, on behalf of Mr. Wilmot, of Hackney, exhibited an albino specimen of a bird, supposed to be a thrush, but in the opinion of the meeting it was a very fine variety of the redwing (*Turdus iliacus*, Lin.). Mr. Hanes, on behalf of Mr. Lewcock, exhibited a series of *Aphodius luridus*, from Richmond Park, Eastbourne, and Bournemouth, showing a variation in colour from almost fulvous to quite black. The specimens were captured by himself, Mr. Gillo, of Bath, and Mr. Cripps.

June 5th, 1890, the President in the chair. Mr. Sampson exhibited a bred series of *Angerona prunaria* from Epping Forest, and two specimens of *Melanippe hastata* from Winchester. Mr. Bellamy an extremely large specimen of *Orgyia pudibunda*. Mr. Smith a female specimen of *Saturnia carpini* from Wicken Fen, and remarked upon the light colour of the cocoons of this species from that locality. Mr. Clark a specimen of *Smerinthus tiliæ*, the hind wings being much darker than ordinary. Mr. Raine exhibited various preserved lepidopterous larvæ. Mr. Lewcock's box of coleoptera contained several specimens of *Harpalus tenebrosus* from Plymouth; Mr. Heasler exhibited several species of Necrophagous beetles from Honor Oak, and a series of *Berosus affinis* from Mitcham. Several members referred to their recent excursions in search of insects, and mentioned the frequent occurrence of white specimens of *P. napi*. Mr. Lewcock's attention was attracted by a very strongly marked imago of this species at Claygate, on May 24th. A discussion also took place respecting the scarcity of various insects this season.—G. A. Lewcock and E. Hanes, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Nothing interesting to entomologists took place at the South London Entom. Society's meeting of *May 8th*, except the exhibition of Mr. Fenn's specimens of *Spilonota pauperana*, recorded last month.

At that of *May 22nd*, Mr. Hawes exhibited ova of *Gon. rhamni in situ*, and Mr. Frohawk some coloured drawings of ova of the same species. Mr. Fenn exhibited some fine *Saturnia carpini*, bred from Bournemouth parents, the females very large, the males exceedingly strongly marked; a long series of very large dark *Cidaria russata*, the remarkable fact being that the female parent was an exceptionally pale specimen (almost white), but that no single specimen showed any tendency to assume this form. Mr. Fenn's best exhibit, however, was a series of some three dozen *Arctia mendica*, the males varying from the ordinary sooty black southern type to a buff form, almost as pale as the Irish var. of this sex; the females showed in some instances a tendency to buff colour, and in one specimen, on the left side, a great increase of black markings, reminding one of Mr. Porritt's magnificent specimens (*Trans. Ent. Soc.*, 1889). Mr. Fenn states that the only explanation he can give of this variation is, that the larvæ and pupæ were subjected to a very great deal of damp and cold during last summer and autumn. The ♀ parent was quite normal. A long discussion on the part played by insects in the cross-fertilisation of flowers was carried on by several members.

[Pending arrangements to get the Reports of this Society up to date, instead of presenting them to our readers six or seven weeks behind time, I propose making notes myself of the matters of interest to entomologists generally, instead of publishing the stereotyped official reports.—ED.]

The Entomologist's Record
AND
JOURNAL OF VARIATION.

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BOOKS ON NEUROPTERA AND TRICHOPTERA.

By G. T. PORRITT, F.L.S., F.E.S.

Mr. Tutt, by inadvertently misquoting my letter (*ante*, p. 61), fails to give the meaning I intended to convey. I did not say, "There is no book on the Neuroptera."[1] What I wrote was, "There is no book on the British Dragonflies nor on the British Neuroptera as a whole." There are several monographs on separate groups, and the works by McLachlan, *The Trichoptera of the European Fauna*, and Eaton's *Monograph of Recent Ephemeridæ*, the latter forming Vol. III. of the *Transactions of the Linnean Society of London* (Zoology, 2nd Series), are beyond all praise. On various groups, too, McLachlan's *Monograph of the British Neuroptera-Planipennia*, including the *Sialidæ*, *Raphidiidæ*, *Osmylidæ*, *Hemerobidæ*, *Chrysopidæ*, *Panorpidæ*, etc., published in Part II. of the *Transactions of the Entomological Society of London* for 1868 is most useful; and so are Dr. Hagen's *Synopsis of the British Psocidæ*, *Synopsis of the British Dragonflies*, *Synopsis of the British Planipennia*, and *Synopsis of the British Ephemeridæ*, published in the *Entomologist's Annuals* for 1861, 1857, 1858, and 1863 respectively. Mr. McLachlan's *Trichoptera Britannica*, published in *Transactions of the Entomological Society*, 1865, will be found very useful in the absence of the same author's more recent and bigger work. There is no separate monograph on the British *Perlidæ*, and this is much needed. But perhaps what

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[1] **Mr. Porritt wrote "On the Dragonflies," as he says. The error was decidedly mine.—Ed.**

is most wanted at present is a good monograph on the British Dragonflies, written by a competent person. It should contain coloured figures of all the species, drawn from *living* specimens, and in the case especially of *Agrion* and the allied genera, should have magnified figures, clearly showing the shapes of the markings on the second segment of the abdomen, as well as of the anal appendages, which form the best distinguishing characters in the group. But it would be worse than folly for anyone who has not for some years had experience with and paid close attention to the order to attempt anything of the kind.

THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(Continued from page 29).

Acronycta (*Viminia*) *auricoma*.—This species, so far as my experience goes, is the least common of all our British species; at least I have so far failed to secure living British examples, and have had to be satisfied with the study of specimens derived from continental *ova*. It appears to be somewhat localised in a few spots in the south of England, where it occurs occasionally, tolerably freely at sugar, and though I have heard of no considerable captures of recent years, I have heard nothing to show that it is dying out. The information I have obtained from several correspondents goes to show that it is double-brooded, probably invariably so, and its being confined to the extreme south is most likely due to this circumstance, the temperature further north being insufficient to secure the double brood.

Several of our *Acronyctas* appear to be usually double-brooded on the continent, or at least in many of the warmer districts; but in England it is their normal habit to be single-brooded, and only *auricoma* appear to insist on being double-brooded. It is therefore somewhat curious that last year I obtained continental eggs of the spring laying, that is, the summer brood that ought to have emerged at the end of July and August, but not one did so, all remained over till this year—proved, in fact, to be simply single-brooded.

It may be convenient to put together my observations on the other species in this matter. *Rumicis* and *tridens* are the only species that I have observed make fairly successful attempts to be double-brooded, but I fancy, in a state of nature, they are usually unsuccessful; that is, that the specimens that emerge in the autumn do not do so early enough to give their progeny time to certainly feed up before winter. The first brood of *tridens* that I reared in 1886 divided itself into two portions, one of which came out at the beginning of August, the other remained over till the following year. This experience has not occurred to me since, nor have I ever had an autumnal emergence of *psi*. *Rumicis* very commonly affords an autumnal specimen or two, and it not unfrequently puts in an appearance at sugar in August, in the south of England.

Sundry species occasionally remain two or more years in the pupa state. I never had any of the *Viminia* group do so successfully. *Psi* and *tridens* have presented two or three pupæ that remained alive till the following year, but failed to emerge. *Alni*, *strigosa*, and *aceris* have never shown any tendency of this sort; but with *megacephala* it is quite frequent, half of a brood sometimes going over to the second year, and emerging as satisfactorily as in the first year, and some take a third winter in the pupa state. *Leporina* also goes over a second year easily and successfully, but in a smaller proportion of cases, and rarely takes a third year. *Ligustri* remains over sometimes, but has so far in my hands failed to emerge.

The egg of *auricoma* is laid in the imbricated manner characteristic of *Viminia*, but, like *myricæ*, in smaller groups than in the others, and with more frequent single specimens. It is 1.1 mm. in diameter, and about two-sevenths of this in height, the ribs are fifty-seven to sixty in number, and are waved or crenulated as in the other species; pale creamy when first laid, it passes into a rich reddish chocolate brown, with numerous white or creamy spots, which are more regular and distinct in outline and distribution than the pale markings are in the other species of *Viminia*. In several instances my drawings of the eggs of *Acronycta* have not been taken at the best point in the development of the markings, which, after reaching their best and most perfect stage, rapidly became confused and obscure again as the young larva within matures.

In this clearness and distinctness of the rounded white spots this egg comes nearer, in general aspect, to that of *alni* than do any of the other species of *Viminia*, but the spots are smaller and more numerous than in *alni*, the outer or marginal set forming a tolerably complete ring of small spots; the remainder are small enough, but hardly regularly enough disposed to be described as forming two inner rings, besides a few central spots; the central spots are much larger than the others.

The larva when newly hatched is pale, but very shortly the tubercles become black, and are so closely set together as to make the larva appear quite black; it is indeed only as it feeds, so as to separate the tubercles a little, that its proper coloration is clearly seen. It is then apparent that segments 3.4, 6.7, 10.11, and 13 are paler than the others. The form of the tubercles is that due to their being closely packed together, the posterior trapezoidal being wedge-shaped, and, so to speak, pushed in between the anterior trapezoidal and the superior spiracular. As the larva grows from 1½ mm. long to about 3 mm., the tubercles float apart, and the whole larva looks paler; it is now of a chocolate brown, with black tubercles and lighter markings. The pale segments have what seems to be a white mark below the trapezoidal tubercles, and on these segments there is very distinctly a paler area around each tubercle; this is also visible on the dark segments, but very obscurely. The head is black. The anterior trapezoidals are very large, and so assume a very dorsal position, thrusting the posterior trapezoidals into an almost lateral position; they (the anterior trapezoidals) have five to seven hairs each, the other tubercles each one hair; the posterior spiracular and marginal tubercles are very small; the tubercles of segments 5 and 12 are very large, as are the segments themselves, whilst 11, and to a slight degree 10 also, is small, with small dorsal tubercles with only five hairs, very decidedly shorter than those on the other segments, which in length rather exceed that of the larva itself (when full-fed in this skin), *i.e.*, about 3 mm. The dorsal plates on 2 and 14 have each eight hairs.

In the second skin the length is from 2½ to 4½ mm.; before feeding it is, as in previous skin, black, from the large size and close packing of the tubercles. The anterior trapezoidals are especially large. As the larva grows the pale segments again show themselves, and the skin of the dark segments is seen to be brownish, and not black; the 5th and 12th segments are now very large (humped), the 11th is markedly small, and, viewed dorsally, looks meagre and slender from the smallness of its tubercles. The hairs are all black; about a dozen on the large anterior trapezoidal tubercles, and several on all the others except the posterior trapezoidal of 11, which has only one, as also the posterior spiracular tubercles, which are dwindling, the subspiracular and marginal tubercles are longitudinally linear; the paleness of the pale segments especially appears as a white area around the posterior trapezoidal tubercles, and as the larva becomes full grown (in this skin), the paleness of these segments looks no longer a weakness or defect, but takes the form of a bright yellow area around the posterior trapezoidals. All the tubercles appear to have a pale line round them; this is most marked in the subspiracular, where the paleness on their upper margins forms a pale lateral line, apparently continuous across the dorsum of the 13th segment, where the paleness is whitish instead of yellow, as noted above in regard to the other pale segments.

In the third skin the larva is again black at first, from close setting of the tubercles; its length is 5 to 9 mm. The posterior spiracular is now a mere dot, but the other tubercles are large, the anterior trapezoidal the largest, with twelve hairs. The posterior trapezoidal and subspiracular tubercles now have a few shorter pale hairs in addition to the longer black ones. The 5th and 12th segments are still much the largest, perhaps hardly to be called humped, and the 11th is still weaker than its place in the series requires. The colour of the skin is a light rufous brown, the pale segments 3.4, 6.7, 10. 11, have a brilliant yellow area below the anterior trapezoidals, and reaching down to half-way between the posterior trapezoidal and the supra-spiracular tubercles. (On 3 and 4 it reaches the tubercles that appear to correspond with these.) A pale whitish area surrounds the black spiracles, the yellow marking crosses the back of 13, and is continuous with a lateral line above the subspiracular tubercle as in previous skin, and yellow markings exist anteriorly and posteriorly on the dorsum of the 12th segment.

In the fourth skin (length 9 to 15 mm.) the larvæ are no longer of uniform colouring, all have the *rumicis* form of high (if not actually humped) 5th and 12th segments—head black, some are coloured as in previous skin, *i.e.*, the tubercles all black, and with a bright gamboge area in the pale segments between the trapezoidals. Some are inclined to lose this colouring, but none are absolutely black. In others the yellow tends to form a continuous band through segments 8 and 9. In these more highly coloured larvæ the trapezoidal tubercles are orange instead of black; in some even in the 5th segment. The most striking have very little yellow on the skin, but have all the trapezoidal tubercles brilliant orange. The hairs vary from entirely black in a few of the darkest to orange on the trapezoidals. In most of them the lateral hairs are cinereous. In a large well-marked specimen the subspiracular and marginal tubercles are surrounded by a greenish yellow line or ring, and there are a few scattered marblings tending to connect these into a longitudinal lateral line. Each tubercle has twenty-two to twenty-five hairs, half the diameter of the larva in length, except the post-spiracular, which is a mere dot. Amongst the varieties, some of the darkest specimens have the orange markings replaced by lemon yellow, and one specimen is entirely black, except the orange tips and hairs of the trapezoidals of 4 and 6 to 13, the hairs of 5 being also orange.

These larvæ were hatched on May 22nd; on June 19th many were laid up for fourth moult, and it is noted that of these some few are nearly three times the bulk of others, certainly much more than twice; they are nearly one-fourth longer, and nearly twice as thick; length respectively 11 mm. and 15 mm., diameter 2¼ to 3½ and 3 to 4½ mm. The event proved that these large larvæ only moulted four times, passing now into the last skin, whilst the majority moulted five times.

In the fifth skin the form is still that of *rumicis*, *i.e.*, with large 5th and 12th segments, and they are much more uniform in colour than in the fourth skin. The larva is black, with the trapezoidals of the segments from the 4th backwards, orange golden; slightly also the dorsal tubercles of the 3rd; in most the space between the trapezoidals is also orange, in 6.7, 10. 11, and the incision between 12 and 13 also. The variations are for the posterior trapezoidals to be black, especially in 5, 8, and 9; and for the orange on 10 and 11 to be a broad, continuous streak across both segments. The posterior trapezoidals are the smallest tubercles, the length of the hairs is little more than half the diameter of the larva. The hairs on the tubercles have not the tufted stellate aspect that they have in *menyanthidis*; this appears to be due to some extent to the tubercles being flatter, not so rounded and knobbed as in *menyanthidis*, but chiefly to the colouring, the dorsal hairs being red, the lateral pale cinereous, but with a sprinkling of black ones, and also there being some longer hairs interspersed, especially in front and on the 12th segment.

June 28. In last skin the full-fed larva is very handsome, being black, with a double dorsal row of orange red tubercles, and hairs of the same tint. At first it suggests *H. dispar*, but on a closer view, notwithstanding the abundant hairs, a striking likeness to *Acronycta alni* suggests itself, chiefly, perhaps, from the colour and apparent texture of the black velvety sides, and the orange tubercles, recalling *alni's* yellow lozenges. There is no longer the outline of *rumicis*, the 5th is the largest segment, and that is all that can be said for it. The 12th is in no wise larger than those in front of it; behind 12 the form is somewhat truncate. The segments are rounded, of a glistening velvety black, becoming dull and sooty at the incisions; the tubercles and hairs are also black, except the anterior trapezoidals, which, with their hairs, are of a golden red; the dorsal tubercles of 3 and 4 are included in this set, but 2 is black; the posterior trapezoidal of 12, and four tubercles in 13 belong to the coloured series. In some specimens the posterior trapezoidals, which are smaller than the anterior, are also coloured, those of the 5th segment are usually so. The majority of the hairs are 2½ to 3 mm. in length, but a few in each segment, chiefly the supra-spiracular, are 5 to 6 mm., and some on 2, 3, and 12 are as much as 9 mm. in length. The uncoloured hairs are chiefly black, but some pale ones are interspersed; the posterior spiracular tubercles have three small hairs.

July 3rd. They are spinning up.

The cocoon is of rather whiter silk than in most of the other species of *Viminia*, and leaves, twigs, etc., are drawn together to cover it. It presents no distinct structure to facilitate the emergence of the moth.

Details of the pupæ are figured in Pl. I., 5.

The characteristic hooped margin of segments is least marked in *auricoma* of any member of the *Viminia* group. This portion of the segment is distinctly marked off by its smoothness from the rest of the segment, and looks raised; but as a matter of fact it hardly rises above the level of the rest of the surface. It also differs in having the nodules between the eyes closer together than in the other species, and occasionally the nodules are united together (the ordinary form in *Simyra nervosa*). The anal armature, and indeed the whole pupa, is so close to the other species that an absolute description would apply almost equally to any of them. As compared with *rumicis* the mesothorax is not so overhanging, the incisions of the free segments are black. The bristles of the anal armature are shorter, stiffer, darker, and look more regularly placed than in *rumicis*, the upper corners of the square extremity are more *rounded than in rumicis*, and each have two minute points; the fine hairs are smaller than in *rumicis*, and being black easily elude notice, at least on segments 12 and 13.

Acronycta (*Viminia*) *myricæ*.—My acquaintance with this species is not of that intimate character that results from frequently meeting with it in its natural home. I have only once captured the larva in Great Britain, and not unfrequently the same or a closely allied form in Switzerland. I have, however, several times reared the larva from the egg.

I have not learned the precise limits of its range in Great Britain. Its head-quarters appear to be at Rannoch, and that portion of Scotland to the north-east of Rannoch. Whether it occurs in the north-west of Scotland I do not know; it does not occur in the south, and as regards the west and south-west my solitary capture was made in Argyleshire, where it must be excessively rare, probably an occasional immigrant, or I should have seen more of it.

It appears to emerge in its northern habitat as early as *rumicis* and its congeners do in the south, that is to say, in the first half of June, or later in some seasons.

The egg is laid in the imbricated manner characteristic of *Viminia*, but in smaller batches, and more often solitarily than in the other species. It differs also by varying in size more frequently than any of the others do. Two adjacent eggs, for example, measured in diameter 1 mm. and 1.33 mm., the average being about 1.15, and the height 0.5 mm.; the ribs are about 66 in number. The colour is somewhat richer than, say, *rumicis* has, the yellow soon becoming of a pale salmon pink, and passing on to a purplish brown, with paler reddish brown spots; these pale areas are smaller and more irregular than in *auricoma*, but preserve more the form of separate roundish spots than they do in *rumicis*, where they run together and form bands and streaks.

The ribs unite together somewhat regularly as they approach the vertex; there are no transverse striæ, but the ribs are waved or crenulated much as in the other species of the genus.

The newly hatched larva is almost impossible to distinguish by description from that of the other species of *Viminia*; after it has fed a few days each species differs somewhat in the aspect of the pale markings of the pale segments, and can be distinguished when compared together. These differences are fully shown in the drawings of these larvæ. The length is 2 mm., with hairs as long, the hairs are black and vary in thickness, looking nodulated when magnified. The predominance of the anterior trapezoidal tubercles is as fully pronounced as in any other species of the section, presenting themselves as two great dorsal bosses on each of the 5th to 12th segments, and each carrying six hairs, the other tubercles each carrying one, except the posterior trapezoidal, which has a second short hair. They tend to be angular, as if fitted to each other (as is really the case), as in the other species. The 2nd segment has a plate carrying long hairs, the dorsal tubercle of the 3rd has three hairs, and of the 4th four. The dark segments are rufous in colour, the 11th is the palest of the pale segments, the tubercles are only just less pronounced than in the others. The darkest segments are 5, 8, 9, and 12.

After the first moult the larva may be easily distinguished from its congeners; it is hairy and looks black from the black tubercles and hairs, but the skin tint is rufo-fuscous; general aspect cylindrical, with prominent tubercles and deep incisions. There is a yellow line between the spiracles and the subspiracular tubercles, the hinder part of the dorsum of the 3rd segment is yellow, forming a transverse line. Each posterior trapezoidal tubercle is enclosed in a whitish patch, which reaches round to the front of the anterior trapezoidals. The supra-spiracular tubercle is surrounded by a pale or white circle, most distinct as a line above it, and on the paler segments 4, 6.7, 10 and 11. The marginal tubercles also have pale circles round them, and there are some other pale irregular mottlings; the anterior trapezoidal tubercles now have ten to twelve hairs.

After the second moult (in third skin), it is at first the same as in the other species of *Viminia*, very black, from the crowding of the tubercles, but is distinguished by the orange line across the 3rd segment, and the narrow lateral line; but, as it grows, the paleness of the dorsal area shows itself, being in some specimens nearly white, the dark tubercles standing out very conspicuously. The anterior trapezoidal tubercles are very large, the others smaller, and the posterior spiracular has dwindled to a point much like the spiracle. The yellow lateral line is now broad, and includes the subspiracular tubercle. The white dorsal area consists essentially of white rings round the trapezoidal and supra-spiracular tubercles; the larvæ differ much in tint: in a few dark ones these rings have to be carefully looked for; in others the whole back, or nearly so, is of porcelain whiteness, and there are all intermediate varieties; the area between the trapezoidals on each segment, and the pale segments among the segments, are the whitest in those intermediate varieties which are the most numerous. In some, for instance, the inter-trapezoidal area is quite white on the pale segments, but has a line on the dark segments separating the anterior from the posterior trapezoidal ring.

After the third moult (in fourth skin) the orange line is broader, the white markings of the back are much as in the previous skin, but more pronounced, in that the darker forms are less numerous and the white marks less clearly result from rings round the tubercles; the hairs and tubercles are still black. There is now a distinct trace of the *rumicis* form, that is, the 5th segment is the largest, and the 12th is unduly large for its position in a dwindling series. After the fourth moult (in fifth skin) the larva loses the *rumicis* form, there are now shorter whitish barbed hairs plentifully intermixed with the black ones. These were indeed present in many larvæ in the previous skin, and give the larva a hoary look. It is very possible that in some individuals this skin is the last, as in the other species of *Viminia*, but I failed to detect an instance, probably because I was not on the look out for it; and in actual practice it is no easy matter to be sure of the number of moults of more than a few specially watched individuals.

I have kept no detailed description of the full-grown larva: it has no *rumicis* outline, though it is thickest at the 5th segment, the white hairs largely overpower the black ones in giving the general tint of the larva, and the white marking is even more variable in amount and distribution than in the third skin. A few larvæ are almost entirely creamy white, others have a trefoil white mark on each segment, and a few have even less white coloration.

The cocoon is of similar construction to that of *rumicis*, the silk is paler, but not so pale as in *auricoma*, where it is sometimes quite white; cocoons from Rannoch have usually bits of burnt heather attached to them; why the larva should select places where the heather has been burnt to pupate in is not clear. Most probably we get such cocoons because those in such situations are more easily seen and collected. There is at the top of the cocoon a weak place left for emergence, the external *debris* is brought together closely, but silk is sparingly used; there is, however, nothing that can be called a valve or lid.

The pupa is black, very like that of *rumicis*, but less pronounced in its markings and processes. The knobs between the antennæ are slight elevations, closer together than in *rumicis*, less so than in *auricoma*. The "hoops" of the abdominal segments are broad and flat, and would hardly be described as hoops, except for the homology with the other species, and the warts of the dorsum are less large than in *rumicis*, and fade away towards the margin sooner. The membrane of the incisions is nearly black. The apical portion of the pupa is larger, more round and blunt than in *rumicis*, the brown bristles are darker, sparser, and shorter, and the hollow in the ventral aspect is deeper ; the apex might almost be described as hemispherical, but that the ventral portion of the hemisphere is wanting, owing to this hollow—it is rough, and has several indistinct points along its dorsal margin. The hairs are exceedingly minute, almost microscopic, especially those at the antennal base: there are also a few hairs on the prothorax.

In Plate II., the details of the pupæ of *Viminia* are shown (*auricoma* is in Plate I.). The differences between the several species are well represented, but are, if anything, somewhat exaggerated. The two anterior nodules are large and near together in *menyanthidis*, smaller and further apart in *rumicis* and *venosa*. The difference in sculpturing shown (*a*) is rather due to a slightly different aspect of each pupa having been taken, all have a tendency to this decided marking on the prothorax shown in *rumicis*, and *rumicis* rarely has it in so pronounced a degree. The "hoops" (*b*) are most marked in *rumicis* and *venosa*, least in *myricæ* and *auricoma*. As regards the anal armature (*c*) the differences are not really quite as marked as shown; all have the stiff brush of brown bristles, and all have certain nearly obsolete spines or points, which in *venosa* and *rumicis* are so placed as to form the angles of a somewhat quadrangular end, in *myricæ*, and still more in *menyanthidis*, the end is larger, more rounded, and the spines or points are less marked and terminal, but they are not so decidedly different from *rumicis* and *venosa* as the drawings suggest. In *menyanthidis* the bristles are less pronounced and easily lost, but they are usually rather more abundant than shown in the figure. Indeed the degree to which these bristles persist makes much more difference between the species in appearance than the actual pupa, apart from the bristles, really presents; they are, however, more abundant, larger, and more persistent in *rumicis* and *venosa* than in the others. All these pupæ have two small hairs at the base of each antenna; these are also to be found in the other *Acronyctas*, and indeed in many NOCTUA (and other?) pupæ, but are often so fine as to be easily overlooked.

EXPLANATION OF PLATE II.

Natural Size.—Fig. 1.—Pupa of *Viminia myricæ.*
Enlarged about 8 diameters. { Fig. 1a.—Pupa of *V. myricæ;* dorsal view of anterior extremity.
Fig. 1b.—Pupa of *V. myricæ*; 9th segment, lateral view.
Fig. 1c.—Pupa of *V. myricæ;* lateral view of posterior extremity.
Natural Size.—Fig. 2.—Pupa of *Viminia menyanthidis.*
Enlarged about 8 diameters. { Fig. 2a.—Pupa of *V. menyanthidis;* dorsal view of anterior extremity.
Fig. 2b.—Pupa of *V. menyanthidis;* 9th segment, lateral view.
Fig. 2c.—Pupa of *V. menyanthidis;* lateral view of posterior extremity.
Natural Size.—Fig. 3.—Pupa of *Viminia venosa.*
Enlarged about 8 diameters. { Fig. 3a.—Pupa of *V. venosa;* dorsal view of anterior extremity.
Fig. 3b.—Pupa of *V. venosa;* 9th segment, lateral view.
Fig. 3c.—Pupa of *V. venosa;* lateral view of posterior extremity.
Enlarged about 8 diameters. { Fig. 4a.—Pupa of *V. rumicis;* dorsal view of anterior extremity.
Fig. 4b.—Pupa of *V. rumicis;* 9th segment, lateral view.
Fig. 4c.—Pupa of *V. rumicis;* lateral view of posterior extremity.

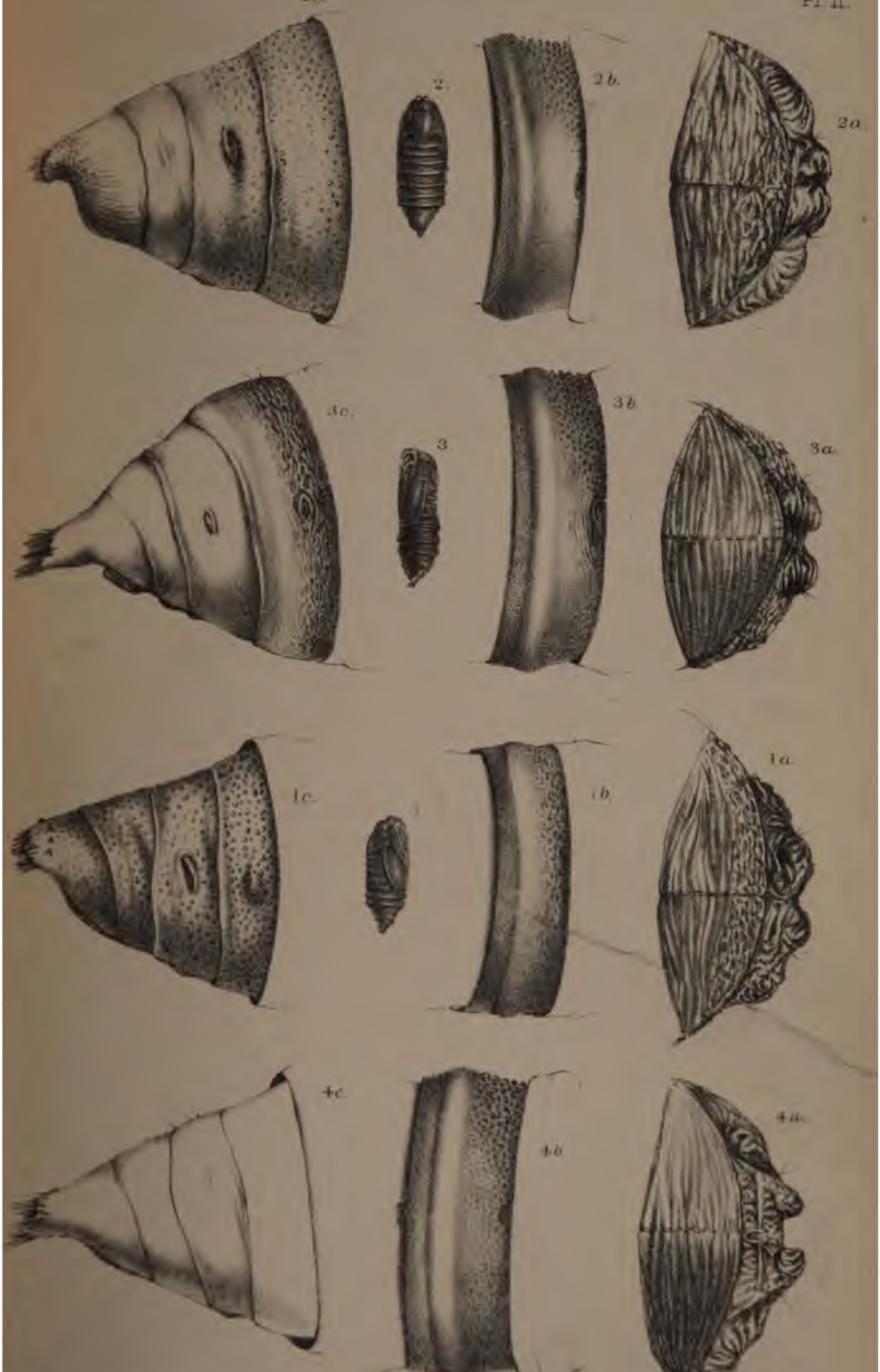
MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page* 56.)

BUT there is no doubt that another local condition, at least, is brought into play in aiding "natural selection" in its work. I refer to the presence of large wooded tracts in districts where this artificial (so to speak) darkening of surfaces is occurring. It is well known that large arid tracts of land in different parts of the world have been planted with trees to increase the water supply of such districts, and it is as well known that the action of these trees on the atmosphere is such, that vast quantities of vapour are condensed from it, and the atmosphere in such a district becomes charged with moisture and very different to its previous dry condition. It is also well known that all large wooded areas have a moister atmosphere than areas in immediate contact with them which are open in character. Probably no trees have a tendency to hold so much moisture as the different kinds of fir trees. I have long noticed this tendency, and there is no doubt that the presence of moisture in such localities, helps to make the natural dark colour of these trees still darker; add to this that fir trees, by means of their foliage, shut out an immense proportion of light, and we can readily understand that "natural selection," would leave, to a great extent, only the darker insects in such situations. I *find it an actual fact* in the south of England, that such localities

Pl. II.



Knight ad nat. del.

Pupæ of Genus Acronycta

West, Newman, lith.

give us a greater proportion of darker specimens of many species that naturally rest on tree-trunks, than do comparatively open woods of more mixed growth. If we add to these natural conditions the presence of chemical fumes, smoke, and other atmospheric impurities which are specially characteristic of large manufacturing districts, we can see how intensified the tendency to melanism would become in such districts. Only those insects that become positively black, would have in many places the slightest chance of escape, and "natural selection," by weeding out the paler specimens, would leave only the darker, and "hereditary tendency" would play its part in the intensification of the colour of the species. I would now cite examples which I think will tend to prove this view.

Thanks to the generosity of Mr. Sheldon and Mr. John Hill of Derby, most of us I suppose, who are interested in this subject, possess specimens of *Tephrosia biundularia* from this locality. Those I had some years ago from Mr. Sheldon are dark, but comparatively pale compared with some sent me a few years later by Mr. Hill. Some time ago Mr. Sheldon, who is one of our most observant lepidopterists, told me what he considered the history of the melanism of *Tephrosia biundularia* in the neighbourhood of Derby,[1] and for the purpose of this paper, I wrote to Mr. Sheldon, asking him to give me the particulars. I now quote his statement, which is as follows:—"Some 12 or 13 years ago, I found that *biundularia* occurred freely in a wood near Derby. The growth was composed of spruce, and Scotch firs, larch, oak, etc., and would be then some twenty years of age. The *biundularia* were of all shades, from the light southern type to a form about as dark as typical *T. punctulata.* A large percentage, 50 per cent., would be the light form. This was from 1876–1879. In 1880 I left the district, and did not do any more collecting in it till 1885, when I found a difference in the *biundularia;* not only were the extreme dark forms darker than any I had previously noticed, but the percentage of pale ones was much less, not more than about 15 to 20 per cent. of the whole. I have not done any collecting there since, but I am told by a resident collector that it is now difficult to find the light type, and so the darkening process appears to be going on." With respect to the cause of this, Mr. Sheldon writes:—"I consider it to result from two reasons:—(1). The gradual growth of the trees makes the wood darker than formerly. (2). The dark specimens being much more protected from their enemies by their greater resemblances to objects rested upon, have by "natural selection" gradually assumed their present state. Note also, the wood has been much *collected* of late years, and the light specimens naturally are taken in much greater numbers than dark ones." This really is my own view, except that I think the darkening of the trunks arises perhaps less from the shutting out of light, than to the natural increase of humidity due to increase of age of trees and greater condensation, and to the gradual increase of Derby as a manufacturing centre.

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[1] Vide *Ent. Mo. Mag.*, vol. xxiii., p. 6.

Another extreme case, almost on all fours with this, is a most extraordinary development of extreme melanism in *Boarmia repandata*, near Huddersfield (*Ent. Mo. Mag.*, vol. xxv., p. 161). Mr. G. Porritt, F.L.S., in 1888, bred from a wood in that district some black forms of this species. So intensely black are these extreme specimens, that insects commonly called black, appear brownish beside them. The larvæ from which these specimens were bred came from an intensely dark fir wood, in the midst of what is one of the largest manufacturing districts in Britain, and where the vapour must hold in suspension large quantities of carbon and other impurities. An almost parallel case was cited by Mr. N. Cooke (*Entom.* x., p. 94) in a discussion of this subject, where he writes:—"The most interesting case of melanism that has come under my observation—and my friend Mr. Greening, of Warrington, can say if I exaggerate the facts—is the total change in the colour of *Tephrosia biundularia*, in Delamere Forest. Some thirty years since, when he and I visited Petty Pool Wood, this species was very abundant, appearing in March, and was to be found through April and May, but all were of a creamy white ground colour; dark varieties were so scarce that they were considered a great prize. Now it is the reverse, all are dark, smoky brown, approaching black; a light variety is very rare. The same change, and nearly to the same extent as regards numbers, has come over *Amphidasys betularia*. Throughout the district, from Petty Pool, including Warrington, to Manchester, the black form is now usually found. I am inclined to suspect that climate and manufactures have done more to bring about this change than anything else. During the past thirty years, what large towns have sprung up to the west of this district! Runcorn, Widnes, St. Helens, Earlstown, Wigan, etc; all pouring forth from their tall chimneys chemical fumes and coal smoke, which emanations are carried over our collecting grounds by every westerly wind; and the wind is westerly[1] for nine months out of the twelve. This may have effected a change in the climate (*Entom.* x., p. 94). And yet, after coming to this reasonable and satisfactory conclusion, Mr. Cooke would not allow that "natural selection" had any hand in the matter, because he could not see the difference between "sexual selection" and "natural selection." Had Mr. Cooke seen the line of argument taken by D. F. B. White (*Entom.* x., p. 126), I think he must have been driven to the conclusion that I have (in common, I believe, with many others) arrived at. Dr. White (*Entom.* x., p. 127) says himself: "But what is the exciting cause of this tendency to variation? I think it is (in some cases, at least) meteorological, that is to say, cold or heat, dryness or dampness, presence or absence of sunshine, etc." So that even in these earlier discussions, atmospheric effects held a place, but generally a most subordinate one. In *Entom.* x., pp. 152, 153, Mr. Cooke also writes: "I have also lately become acquainted with the fact that *Tephrosia biundularia* of the dark form, occurs in the "black district" of Staffordshire—in Burnt Wood—not far from which an immense quantity of smoke is produced, by the manufacture of iron and pottery." Criticising Mr. Cooke's article (*Entom.* x., pp. 92–96) Dr. White says: "This aberration *Delamerensis* var. of *biundularia*, and the ab. *Doubledayaria*, Mill., of *Amphidasys betularia* are, however, exceptional cases, and cannot be considered as throwing much light on the origin of the majority of melanochroic forms" (*Entom.* x., p. 128).

Here I differ from Dr. White. They throw a great deal of light on the origin of the melanism in tree frequenting species. The colours of these species lend themselves more readily than those of most species to this peculiar form of variation. Being of a white ground colour with the principal markings black, it follows, that any darkening of surface will be more favourable to those specimens which have an excess of dark colour, than to those which have an excess of light. "Natural selection" will complete the work, and "hereditary tendency" will ensure its intensification. Again, the same species has undergone the same change at Derby (*Ent. Mo. Mag.*, vol. xxiii., p. 6), and has lately exhibited itself to some extent at Birmingham, and in the neighbourhood of Mansfield, Notts.

To show that these are not isolated cases of melanism of this particular class, and that the results obtained in *Boarmia*

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[1] South-westerly would have been more correct.—J.W.T.

repandata, etc. are capable of generalisation; I may add that *B. rhomboidaria* var. *perfumaria*, *Diurnæa fagella*, *Hybernia marginaria* (*progemmaria*), and other tree frequenting species are excessively dark from the Huddersfield locality, and some of the specimens of *Cidaria russata* are blacker from this locality than from any other locality I know, except perhaps from the neighbouring one of Sheffield. *Arctia mendica* has also undergone a remarkable change near Huddersfield, *vide Trans. Ent. Soc.*, pp. 441, 442, and Pl. xiv. (1889).

I will cite one more example from our literature on this subject. It is written by Mr. Edelston, and refers to *Amphidasys betularia*. It is as follows:—"Some sixteen years ago, the "Negro" aberration of this common species was almost unknown. Last year I obtained the eggs of a female of the common form, which had been crossed with a "Negro" male; the larvæ I fed on willow, and had this year some remarkably pretty aberrations, the connecting link between the "Negro" and the usual form, but far before either as regards beauty. I placed some of the virgin females in my garden, in order to attract the males, and was not a little surprised to find that most of the visitors were the "Negro" aberration; if this goes on for a few years, the original type of *A. betularia* will be extinct in this locality" (*Entomologist*, vol. ii., p. 150, and *Ent. Mo. Mag.*, vol. xiii., p. 131).

I will now quote a statement of Mr. Cooke (*Entom.* x., p. 151), which appears to me to illustrate the effect of dampness due to woods on the development of dark forms of lepidoptera. Mr. Cooke says:—"Since my paper appeared, I have bred two dark varieties of a light-coloured species from the chalk. I never saw or heard of a dark specimen of the species before last year, and it puzzles me to account for them, as other dark specimens have been procured from the same *wood* on the chalk. Had it not been so, I should have concluded that the soot on my tree was the cause of aberration; but it is not so, for it is evident there is a dark race of this particular species occurring on the chalk a long distance from any manufacturing district." Just so, I can cite parallel cases in Kent, but there is no doubt the *wood* is the cause of it; the dark race is more readily protected in the wood, where the light race would be prominent, on the other hand, on the chalk itself the white race would be protected; hence, by "natural selection," the darker wood variety would be perpetuated in *the wood, although* the greater number of specimens, if it were a generally exposed species, or one that usually rested on the ground, would be of a lighter race; *Gnophos obscurata*, *Eubolia bipunctata*, *Anaitis plagiata* offer almost parallel cases in Kent. I would here again call attention to the fact that Dr. F. Buchanan White (*Ent. Mo. Mag.*, vol. iv., p. 248) suggested the absence of wood from Breadalbane, as one of the reasons of the difference between insects from that locality and Rannoch:—"Breadalbane, however, has higher mountains and less wood, which may perhaps account for the difference."

In *Ent. Mo. Mag.* xxv., p. 40, Dr. Chapman writes:—"Melanism appears to be a western, rather than a northern form of variation; to be associated with a wet, rather than with a cold climate; and it has certainly been more common of recent years, which may be attributed to the long succession (unprecedented) of wet seasons we have recently passed through. My observation was on *D. fagella.* Twenty years ago this species afforded here an occasional dark or even black var. Happening to meet with one of these, I searched carefully for two seasons, but only got one black and two dark specimens. For the last year or two (result of wet seasons) they have been fairly numerous. Visiting certain oak trees with a lantern one night, lately, and the same observations might, occasion favouring, no doubt have been made during the day, I found the dark var. quite numerous, and about one to three of the ordinary form." Strange to say, the same thing has happened in this locality, the dark var. of this same species may now be frequently obtained in this district, and the general colour is undoubtedly getting darker; in fact, last March, I obtained a specimen in Shooter's Hill Woods, near here, as black as the Huddersfield specimens. Many other species, *Cuspidia* (*Acronycta*) *psi* for example, are darker in London than a few miles out, and I have little doubt that "natural selection" does this work, considering the general darkening of surface, which objects in London undergo. But the smoke of London has less intensifying force, so to speak, than that of Yorkshire, because the atmosphere is less humid, and hence the melanism of lepidoptera in this district is less general and intense than in localities, where, with an equal quantity of smoke, there is a greater rainfall or more humid atmosphere.

I have heard many observant and thoughtful lepidopterists attempt to correlate dark forms occurring in woods, etc., such as I have previously referred to, with the deficiency of light in such situations, and attempt to argue that this deficiency acts, in some unknown way, on the larvæ which live in these dark situations, in the production of these forms. I cannot understand myself, how light can affect larvæ in this way, and I believe, there is nothing in the absence of light, which can lead us to assume that it is a primary influencing cause in the production of these forms. Again, I have heard the same reason advanced as an explanation of such dimorphic forms as those of *Hypsipetes elutata*, where a generally larger and more brightly coloured form feeds on willow and sallow, and a smaller and generally darker form occurs on bilberry. The two forms often occur side by side in the same districts. The difference in size, I believe to be entirely phytophagic, but the difference in colour,[1] I assume to be due to the same causes as in other melanic forms, viz., the darker surroundings which protect darker forms, and thus by "natural selection" give us a darker race. The large *elutata* of the south rest among the leaves and on the willow stems, the moorland forms chiefly on the ground. Mr. Birchall's opinion, before referred to (*Record*, p. 55), would be much of this character, and throughout his paper (*Ent. Mo. Mag.*, vol. xiii., p. 131) we find that he considered the absence or deficiency of sunlight, by some occult action on the larvæ to be the cause of melanism.

(*To be continued.*)

SCIENTIFIC NOTES.

NOTES ON THE SYNONYMY OF HAWORTH'S "PLUMES."—I have lately had occasion to pay considerable attention to the synonymy of our British "plumes," and have made a few notes about the synonymy of the "plumes" in Drs. Staudinger and Wocke's *Catalog*, and the "plumes" described by Linnæus and Haworth, which I think it may be advisable to put on record.

It has been frequently urged by those British lepidopterists, who do not care to adopt Staudinger and Wocke's *Catalog*, that very insufficient attention has been paid to British authors, and that their not being conversant with our British species has frequently led them into error. This I was disinclined to believe, and still consider there are very few errors in Dr. Staudinger's part of the work, but reference to the synonymy of the "plumes" by Dr. Wocke has convinced me that Haworth's *Lepidoptera Britannica* has received but scant justice at his hands.

Mr. Stainton, in the *Ent. Mo. Mag.*, vol. i., pp. 11–14, points out some of the difficulties attending the proper application of the Linnæan descriptions. Of the species in the *Systema Naturæ*, 10th edition, p. 542, the 12th edition, pp. 899–900, and the *Fauna*

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[1] *In some districts* the large form is quite as dark as the smaller where such a *coloration is of* advantage to the species.

Suecicæ, p. 370, *monodactyla*, *pentadactyla*, and *pterodactyla* (*fuscus*) are fairly well-defined as British species, although I would point out that the Linnæan description of *monodactyla*, *Systema Naturæ*, 10th edition, p 542: "*Alucita*, alis patentibus linearis indivisis," is unsatisfactory, as far as the "indivisis" is concerned. But the description, "inferiores fere tripartitæ," etc., in the *Fauna Suecicæ*, p. 370, No. 1452, makes it quite clear that it cannot belong to the *Agdistis* group.

(1). *Didactyla*, Linn. This species is happily settled and fully determined by its foodplant. Linnæus gives, *Systema Naturæ*, 12th edition, p. 899: "Habitat *in Geo rivali*." Mr. Stainton, *Ent. Mo. Mag.*, vol. i. pp. 12-14, gives a full account of the plume in *Geum rivale*—the *Alucita didactyla* of Linnæus. This is not a British species, and therefore cannot be the *didactyla* of Haw., which I shall refer to again.

(2). *Tetradactyla*, Linn., and *tridactyla*, Linn.; *tetradactyla*, Haw., and *tridactyla*, Haw. About the species *tetradactyla* and *tridactyla* of Linnæus, there is, as Mr. Stainton pointed out (*Ent. Mo. Mag.*, vol. i., p. 12) some difficulty. The Linnæan species *tetradactyla* of the *Fauna Suecicæ*, pp. 370-371, is without doubt the species we know by that name. "Alæ superiores lineares: linea alba, longitudinali, ut soli margines obscuriores, immaculata. Pedes albi." The "linea alba" is most characteristic of ♂ *tetradactyla*, but in the *Systema Naturæ*, both 10th and 12th editions (10th, p. 542; 12th, p. 900), *tetradactyla* gets a fresh description: "*Alucita* alis patentibus fissis flavescentibus," which fits our species nowhere; but to muddle matters, the *tetradactyla* description of the *Fauna Suecicæ* is applied to a new species *tridactyla*, and therefore the *tridactyla* of the *Systema Naturæ* becomes synonymous with *tetradactyla* of the *Fauna Suecicæ*, both representing our ♂ *tetradactyla*. The difficulty now remains what is the *tetradactyla* of the *Systema Naturæ?* The "flavescentibus" is the puzzle. It might refer to the closely-allied *baliodactylus*, but this is not a Scandinavian species, and therefore very improbable. It might be an entirely different species—"*osteodactylus*," or some other—or finally, it may be that Linnæus is practically correct, and the *tetradactyla* of the *Systema Naturæ* is the ♀ of that species, as the ♀ is very different to the ♂, and is of an uniform dirty yellowish-white colour. Haworth, in the *Lepidoptera Britannica*, p. 477, uses the Linnæan diagnosis for *tetradactyla* from the *Fauna Suecicæ*, and afterwards adds the description (*vide* above) from the same work, and which, as I have before said, is most distinctly our *tetradactyla*. But we have to remember (as I have also pointed out) that this species is sexually dimorphic, that the male has dark costal and inner margins with a longitudinal white line, while the female has the anterior wings entirely whitish. Linnæus may have (as I have previously stated) described the sexes as distinct; Haworth, I think, certainly did. Haworth (quoting Fabricius) describes *tridactyla* as: "*Alucita* alis fissis; anticis bifidis albis, posticis tripartitis fuscis, Fab.," and then adds: "Parvus, distinctis alis anticis fissis totis albis, posticis trifidis fuscis" (*Lepidoptera Britannica*, p. 477). This I consider a very fair diagnosis of the female *tetradactyla*.

(3). *Tesseradactyla*, Linn., and *tesseradactyla*, Haw. We now come to another species, *tesseradactyla*. This species is given as British by Haworth, but the species known on the Continent by this name is not a British insect, the name being applied to a species closely allied to *gonodactyla*. The Linnæan description, *Systema Naturæ* (12th edition, p. 900) might mean anything: "*Alucita* alis patentibus fissis cinereo-nebulosis; posticis fuscis." Haworth (quoting Fabricius' description) writes: "Alis patentibus fissis cinereo-nebulosis; posticis fusco nebulosis," which is (except the last two words) exactly the Linnæan description; but Haworth adds: "Habitat prope Londinum at rarissime." If the Continental lepidopterists are right in their assignment of the correct species (a non-British one) to the Linnæan name *tesseradactyla*, it becomes clear that Haworth's *tesseradactyla* (a British one occurring near London) is not the Linnæan one. Haworth places the species between *punctidactyla* and his *didactyla* (= *distans*, according to my determination), and the only British species which has occurred continuously near London, which is "ashy grey," or clouded with "ashy grey," is *lithodactyla*, a species which our early collectors must have known, and taking the few British species, now known, that Haworth does not distinctly describe, I think it is impossible to apply the description to any other British species. Referring to the Continental *tesseradactyla* again, I dare say the Continental lepidopterists have a species, distinct from but closely allied to *gonodactyla*; but I have some specimens of Continental *tesseradactyla*, which are entirely indistinguishable from some large *gonodactyla* I have bred. At any rate, I feel no doubt that the *tesseradactyla* of Haworth is the *lithodactyla* of our present lists. This makes no difference to our nomenclature, as *tesseradactyla*, Linn., is prior, and therefore *tesseradactyla*, Haw., simply becomes synonymous with *lithodactyla*, Treitschke. There is still another point in Wocke's synonymy of *lithodactyla*, which wants clearing up. Wocke makes *isodactyla*, Zell., synonymous with *similidactyla*, Dale. But Dale's description of *similidactyla* is a first class one of *lithodactyla*, and has nothing in common with *isodactyla*, Zell. To make matters more mixed, Dr. Staudinger, in his trade list, has sometimes for sale *Æd. lithodactyla*, *Plat. similidactyla*, and *Plat. isodactyla*, so that Dr. Staudinger's idea of these species is rather muddled, and it would be apparently very unsafe to place the slightest reliance in the correctness of his nomenclature of any of these more difficult species which he may obtain.

(4). *Phæodactyla*, Hb. = *leucadactyla*, Haw. (♀), *lunædactyla*, Haw. (♂). Another sexually dimorphic species—*phæodactyla*—appears, like *tetradactyla*, to have had the sexes named as distinct species by Haworth. The female, from its pale colour, being called "*leucadactyla*" (the lemon plume); the male, from the characteristic lunar mark on the anterior wings, being called "*lunædactyla*" (the crescent plume). Both these names sink as synonyms of Hübner's *phæodactyla*, Hübner figuring (14, 15) both sexes of this species under the latter name. Wocke, in his *Catalog*, gives "*lunædactyla*, Haw., 477," as synonymous with *phæodactyla*, but not *leucadactyla*, the paler female form.

(5). *Pallidactyla*, Haw. = *bertrami*, Roes., = *ochrodactylus*, Sta. Mr. Stainton, *Ent. Mo. Mag.*, vol. ii., pp. 137, 138, explained that his *ochrodactylus* was synonymous with *bertrami*. One readily understands, when there was supposed to be only one species, why this author dropped Haworth's name entirely to take up the prior name of Hübner, but when our common British insect, the *ochrodactylus* of Stainton = *pallidactyla*, Haw., became synonymous with *bertrami*, Roessler, and the *ochrodactyla* of Hübner was restricted to the *dichrodactylus* of Mühlig, a new difficulty was created, as undoubtedly the yellow-ochreous species, known to Stainton (*ochrodactylus*), was the species known to Haworth (*pallidactyla*), neither author then having differentiated the new species *dichrodactylus*, Mühlig, which was afterwards referred to *ochrodactyla*, Hb. It therefore becomes pretty evident that our British name *pallidactyla*, is prior to *bertrami* the new Continental name. The diagnosis of Haworth is very distinct. It is "*Alucita* (the pale plume) alis anticis ochroleucis, nebulis aliquot saturatioribus. Expansio alarum 1 unc. Alæ anticæ bifidæ; posticæ tripartitæ fusco-ochraceæ." Wocke refers this to *ochrodactyla*, Hb., = *dichrodactylus*, Mühlig, although it is well-known that Mühlig's *dichrodactylus* was not known in Britain until a comparatively recent date.

(6). *Migadactyla*, Haw. Wocke (as I have just pointed out) not only refers Haworth's *pallidactyla* to Hübner's *ochrodactyla*, but more mysterious still, refers Haworth's *migadactyla*, a species with "white wings" and "white body," to the same species. Now we have, I suppose, only three species with really white wings and white body—*pentadactyla*, *galactodactyla*, and *spilodactyla*, two are perhaps approximately white, but only in the slightest degree—*tetradactyla* and *baliodactyla*. But Haworth describes three white species—*pentadactyla*, *galactodactyla*, and *migadactyla*. He also describes *tetradactyla*, but not *baliodactyla*. This latter species is not white, and does not agree with Haworth's description:—"*Alucita* (the chalk-pit plume) alis fissis albidis fusco maculatis, anticis fissis posticis tripartitis fuscis, *Fab*." "Habitat Cretacis ut valde infrequens." "Statura præcedentium. Corpus album. Alæ anticæ albidæ, fusco maculatæ, posticæ fuscæ. Pedes albi, fusco maculati, *Fab*." (*Lepidoptera Britannica*, p. 478). There is no British species but *spilodactyla*, to which this description could reasonably apply, and Haworth's remark: "Perhaps the last two (*pallidactyla* and *migadactyla*) species would more naturally range immediately after *galactodactyla*," applies very strongly to *spilodactyla*. How Wocke could suppose that one of our white species might possibly be synonymous with Hübner's *ochrodactyla*, I am perfectly at a loss to understand. The *migadactyla* of Haworth is prior to the *spilodactyla* of Curtis. I have left entirely out of account the Fabrician *migadactyla*, as there may be a white Continental (not British) species to which the description might apply, but that does not influence Haworth's use of the name for our species.

(7). *Calodactyla*, Haw. = *acanthodactyla*, Hb. Here Wocke is correct, in referring Haworth's *calodactyla* to Hübner's *acanthodactyla*.

(8). *Punctidactyla*, Haw. Of late years this has been treated as synonymous with Hübner's *cosmodactyla*, but in my opinion, erroneously. Wocke, of course, dropped Haworth's name as a synonym of Hübner's The two great characters of our *punctidactyla* are:—(1). The green colour of the wings; (2). The falcate apices of the anterior wings. I have carefully studied Hübner's *cosmodactyla* (figs. 35 and 36), which are without the characteristic colour, and appear to represent a much more stumpy species even than *acanthodactyla*. How any one can make Hübner's figures satisfy Haworth's: "*Alucita*. Alis anticis virescenti-cinereis albido nebulosis, punctis costalibus numerosis, strigaque postica obsoleta, albis." "Alæ anticæ bifidæ, posticæ tripartitæ atræ;" is beyond my comprehension!

(9). *Didactyla*, Haw. No. 1 dealt with the Linnæan *didactyla* which feeds on *Geum rivale*, and is not British. Haworth's *didactyla* (taken in Norfolk) is a British species, therefore the two species of *didactyla* are distinct. Haworth describes his species as :—"*Alucita* (the spotted rusty plume). Alis patentibus sordide ferrugineis, fascia punctisque albis, anticis bifidis, posticis trifidis. Habitat apud nos valde infrequens. Etiam in Com. Norf., Rev. J. Burrell." This reference to Norfolk is very suggestive of *distans*, and the description "sordide ferrugineis," could only be applied to this of our British species, *distans*, too, is *par excellence* a Norfolk species. Haworth's remark, after describing *parvidactyla*, is very interesting, and affords the strongest possible clue to his *didactyla* and *heterodactyla*. He writes of *parvidactyla* :—"This is the smallest of our "Plume" moths, and it is also one of the rarest. Its characters are almost exactly the same as in the two preceding articles; yet its diminutive size as a species, renders it very distinct." This remark, coupled with the description and locality he gives, seems to settle the species conclusively as the species we know now as *distans*, Zell. Of course *didactyla*, Haw., sinks as a synonym of *distans*, Zell, there being already a *didactyla*, Linn.

(10). *Heterodactyla*, Haw. In *Entomologist*, xxii., pp. 139, 140, Mr. Briggs discussed the priority of this name versus *teucrii*, and decided against *heterodactyla*, Haw., because it could not be proved that Haworth's *heterodactyla* = Villars' *heterodactyla*, but although our species may very questionably be Villars' *heterodactyla*, I do not think there can be any doubt of its being Haworth's *heterodactyla*, which is the matter we are concerned with. Even if it can be proved that Haworth incorrectly used Villars' name and description, yet the new use of a new author makes him responsible for this use. Now, Haworth only described *British* species, and there is only one British species with markings similar to *parvidactyla*, to which the description :—"Alis patentibus fissis, nigris, maculis albis," could possibly apply, and that is *teucrii*. I quite agree with Mr. Briggs that if we consider Villars' species we may well be in doubt, but if we restrict ourselves to British species we can scarcely be in doubt about Haworth's. The name might well read :—

heterodactyla, Haw., Vill. (?).
teucrii, Greening.

Haworth assumed (from description) that Villars' species was the same as his own, just the same as he assumed his *didactyla* was the Linnæan *didactyla*, which we know well now, could not have been the case (because *didactyla*, Linn., is not a British species), yet, Haworth's *didactyla* is British, and would replace *distans*, were there not already another plume named *didactyla*, Linn. On this ground alone, therefore, Haworth's *heterodactyla*, which we know represents *teucrii*—both from description and from Dr. Mason having Haworth's actual type with the name attached—must in correct nomenclature, replace the later name of *teucrii*, whilst Villars' *heterodactyla*, about which Mr. Briggs very properly expresses so much doubt, could be ignored, or "Villars (?)" added after the name.

I am afraid this is very technical, but it shows how little Dr. Wocke *knew of our British* species, when he compiled his list, and also shows that in any new synonymic list which may be compiled, the British authors ought to be more carefully studied.—J. W. TUTT. *June*, 1890.

ANEURISM IN AMPHIDASYS BETULARIA.—On June 8th I bred a specimen of *Amphidasys betularia* ♀, with similar saccular distension of blood vessels to that mentioned by me in the *Record* for June as occurring in *Biston hirtaria;* whilst on June 27th I took a recently emerged *Zeuzera pyrina* ♀, with similarly distended vessels.—F. J. BUCKELL. *June 28th*, 1890.

ANEURISM IN APLECTA TINCTA.—Referring to Dr. Buckell's note (*ante*, p. 57), on the saccular distension of the blood vessels towards the hind margins of the wings of *Biston hirtaria*, I may state that I have noticed it in this species, but it occurs to a much greater extent in *Aplecta tincta.* This species appears to emerge about 5 p.m., and if left until the following morning, the specimens have no scales on the thorax, besides being a great deal the worse for wear, owing to their flying about and injuring themselves. Consequently I always kill them the same evening (perhaps they have not had time to get rid of the superfluous moisture), and when I set them the following morning, the hind margins (especially of the fore wings) are always distended like miniature bladders; my plan after setting in position, is to prick them with a very fine needle, and soak up the moisture by pressing a piece of blotting paper over the wing, which afterwards shows no perceptible trace of the operation, in fact every *tincta* in my series has undergone the operation, and it is entirely unnoticeable.—HOPE ALDERSON. *June 18th*, 1890.

I believe this saccular distension is more common than might be supposed, but, as is usual with so many facts of scientific interest, wants attention directed to it. I have noticed it in *Notodonta dodonea*, *Leucania obsoleta*, as well as *Biston hirtaria.* I am rather of opinion, too, that I have noticed it occasionally in *Abraxas grossulariata.*—J. W. TUTT. *June 19th*, 1890.

COPULATION OF SMERINTHUS OCELLATUS AND S. POPULI.—On Saturday, May 31st, on looking into the boxes in which my pupæ are kept, I found a fine, strongly-marked female of *Smerinthus populi* in copulation with a male *S. ocellatus.* I have since obtained a very large number of ova, the rearing of which should prove interesting (should they be fertile). I have never before heard of hybrids between these species, and should be pleased to hear if any have been reared in confinement.—P. KIRK, 28, Dura Street, Dundee. *June 10th*, 1890.

[Numbers of hybrids between these two species were bred some years ago by more than one collector. Two were sold at the sale of Mr. Howard Vaughan's collection, on April 22nd. My friend, Mr. Hope Alderson, got a similar pairing two years ago, but the ova, if I remember rightly, proved infertile.—ED.]

PROBABLE PARTHENOGENESIS IN DICRANURA VINULA AND NOTODONTA DICTÆOIDES.—Some two years ago I had a ♀ *D. vinula* out in my breeding cage, and, so far as I could discover, she was never *in copulâ* with a male, yet some of the ova proved fertile. At the time I searched carefully, and could not detect a male secreted anywhere in the cage. When the ova hatched it struck me as being very wonderful, but I did not take notes as to what proportion of the ova were fertile.

This year, in May, I bred a ♀ *Notodonta dictæoides*, and have observed the same phenomenon, and I am totally unable to detect a loophole by means of which we can suppose copulation could possibly have taken place. The box in which the ♀ emerged is about 14" long × 6" high × 6" wide, the bottom being covered with a layer of soil 2" or so deep, with a smooth surface, so I cannot see where a ♂ could well conceal himself without detection, as they are not much in the habit of hiding on the ground unless exposed to strong sun. The above ♀ I retained alive for two days in hopes of a ♂ emerging, which result did not come to pass. On the morning of the third day, I found she had commenced laying ova on various parts of the cage. I then killed her, and also scraped the ova from the sides, etc., into a pill-box. I should state that I found a ♂ and ♀, which had apparently just emerged, *in cop.* the same morning as I killed her, but these had not separated when I collected the ova. The majority I left in a large pill-box in a shed, but I took a dozen of them into a greenhouse into the heat in a glass-topped box, to see if they would hatch. As a result I found in the course of about a week that all in the glass box had collapsed, so turned them out, and went to empty the larger box. At the first glance I thought all the ova were in the same condition, as far as I could see, but on turning the box up I noticed one larva at the bottom, and examined closely, finding one ova empty, and two larvæ just on the point of coming through. I did not count the quantity laid by the ♀, but at a rough guess it was considerably over one hundred, all except the three that hatched proving infertile. The point, however, requires yet more careful experiment than the above, to place it on record as an undisputed fact. There possibly may be a slip somewhere, although I don't know how it could be. The strange part to me is, if the ♀ chanced to be *in cop.* at all, how is it that only three out of such a number turned out fertile? One would be inclined to give a much larger proportion, however slight the connection. I mentioned to you, I believe, that I had heard of such a thing happening, from an old entomologist (Mr. Adcock), but did not myself place much reliance on what he said at the time, still, my experience seems to confirm his statement. Next time I may have occasion to communicate with you on this subject, I shall take good care that there is no mistake about any chance copulation whatever, but at the present moment I would not give a *decided* opinion until I have proved it beyond doubt.—HOPE ALDERSON, Farnborough. *June 17th*, 1890.

CURRENT NOTES.

In my paper on "Melanism," my argument in a nutshell is as follows :—"Humidity produces melanism ; the environment of the particular species determines how far and in what direction melanism may or may not be developed ; the manner of rest (habit) determines whether the upper or underside shall principally exhibit the phenomenon ; 'natural selection' may either entirely counteract, or modify, or intensify any tendency to melanism."

Mr. Cockerell's papers in the *Entomologist's Record* on the "*American Varieties of British Lepidoptera*," are taken as the text of an article on "Geographical Variation," by Dr. Skinner, in the *Entomological News* for June, 1890. The part dealing with *Vanessa antiopa* is very interesting to British collectors.

Another proof that there are very few rarities, if we only know the complete how, when, and where of the species, has been proved by Messrs. A. Robinson, B.A., F.E.S., and Bird, F.E.S., taking a large number of *Sesia sphegiformis*. principally by "assembling" in Sussex.

It will be with the greatest regret that our readers will hear of the death of Dr. R. C. Jordan of Edgbaston. I have been greatly indebted to him at many times for information, which was always most freely given. The Pterophorina were his favourite group, and many of the extracts in the *Monograph* of this group, that I am now writing in the *Young Naturalist*, are from his pen.

Eupithecia consignata is recorded from Harleston by the Rev. C. T. Cruttwell, M.A.; *Eupœcilia manniana* and *E. geyeriana* from the Isle of Purbeck, by Mr. Eustace R. Bankes, M.A.

Lithocolletis anderidæ has been bred from larvæ feeding in birch, obtained at Bloxworth, by the Rev. O. P. Cambridge, M.A.

Messrs. G. T. Porritt, F.L.S., G. Dennis, C. G. Barrett, F.E.S., and E. A. Atmore, F.E.S., have bred *Eupithecia extensaria* rather freely this summer.

Mr. B. A. Bower, F.E.S., acting on the suggestion of Mr. W. Warren, F.E.S., found the larvæ of *Phoxopteryx upupana* last September feeding on birch.

A list of the British Orthoptera is published in the *Ent. Mo. Mag.* by Mr. Eland Shaw, F.E.S.

The collection of the late Dr. Signoret has not been kept in France, but has gone to Vienna.

Dr. P. B. Mason records that the females of *Coremia munitata* often have the ground colour of a creamy-white in Iceland.

I captured a specimen of *Sesia allantiformis* crawling over privet blossom in a wood in North Kent.

Mr. T. D. A. Cockerell has returned after a long stay in Colorado. As will be seen in our advertisement columns, Mr. Cockerell desires a Natural History engagement if possible.

VARIATION.

BLACK VARIETY OF THE LARVA OF A. CAIA.—On Saturday, May 10th, I was searching for the larva of this species near here, when I took a very fine variety feeding on stinging nettle (*Urtica dioica*). In this variety the usual red hair on the first three segments and along the sides is replaced by black, thus rendering the larva completely black—in fact, were it not for the black legs, it might be mistaken for *villica*. Thinking that this variation might probably be only external, and have no bearing on the future imago, I made sure of it by preserving the larva.—JAMES A. SIMES, Lower Clapton. *June 19th*, 1890.

LYCÆNA MEDON var. SALMACIS.—This variety is found only on the sea-coast in the neighbourhood of Castle Eden, where the foodplant of the larvæ (*Helianthemum vulgare*) abounds, and although this plant also grows plentifully at some places inland, I have never found v.

salmacis at any other place, nor more than 100 yards from the sea.—T. MADDISON, South Bailey, Durham.

EUCHLÖE CARDAMINES VAR.—I captured near Mansfield on May 28th, a ♂ specimen with the orange colour of the tips rather lighter than usual, and the wing rays running through that part of the wing, distinctly and boldly marked with a rich deep orange colour, which has a striking effect.—W. DAWS. *June 2nd*, 1890.

SMALL VARIETY OF EUCHLÖE CARDAMINES.—On May 24th, I took a specimen of this species near Doncaster, which measures only one inch and an eighth from tip to tip. Is not this unusually small?—A. E. HALL, Sheffield. *May*, 1890.

VARIATION IN THE LARVÆ OF CHESIAS SPARTIATA.—Beating for larvæ of *C. spartiata* on Wanstead Flats, I found three varieties:—(1). *Green*, beaten from plants with little bloom; (2). *Yellow*, where the blossom was very plentiful; (3). *Black*, from old plants with little foliage or blossom. These three varieties seemed to exhibit a most complete response to their environment.—J. A. COOPER, Leytonstone. *June 25th*, 1890.

VARIETIES OF ARGYNNIS ADIPPE AND ARCTIA VILLICA.—I have just had the pleasure of seeing the following varieties belonging to Mr. Maddison, South Bailey, Durham:—(1). *Argynnis adippe* underside var., with the two silvery spots in the discoidal cell of inferior wings, joined to form a long silvery mark, also the two spots nearest the body on the inferior wings joined to form another long silvery mark parallel to body. Both the sides are similarly marked. (2). *Arctia villica* var., with the creamy spot at the base of the anterior wings joined to the costal spots to form a cream-coloured streak under costa; the lower part of same basal spot joined to the two spots on inner margin so as to form a cream-coloured line parallel to inner margin. The basal spot therefore forms the origin of a large creamy bifurcating mark extending from the thorax half way across the wings.—J. W. TUTT. *June*, 1890.

VAR. OF SMERINTHUS OCELLATUS.—On June 21st, I took, close to my house, a ♂ *S. ocellatus* which has the right underwing without the ocellus or eye-like spot, but has instead a dark triangular mark. All the other wings are normal.—W. DAWS, Mansfield. *June 24th*, 1890.

CIDARIA SUFFUMATA var. PICEATA.—This variety appears to be in greater numbers this year than I ever remember having seen it before.—A. HORNE, Aberdeen. *May 21st*, 1890.

SUFFUSED VARIETY OF ACRONYCTA ALNI.—With reference to the variety of *Acronycta alni*, mentioned *ante*, p. 34, I may say that I have bred one this year, which has the forewings suffused with black; it also has a decided buff tinge, and the fringes of both wings are more decidedly spotted than the type.—G. W. K. CROSLAND, Huddersfield.—*June 24th*, 1890.

HYBERNIA MARGINARIA (PROGEMMARIA) var. FUSCATA.—*H. marginaria* is decidedly getting darker in this neighbourhood. The deepening in colour seems to be in the direction of blackish through a warm chocolate brown. One of the best marked specimens I have observed lately, I took about a week ago (May 1st). Though so late it was in fine order.—C. FENN. *May 9th*, 1890.

NOTES ON COLLECTING, Etc.

COLLECTORS.—"Only a collector!" With a slightly cynical smile or a still more meaning look, this phrase frequently falls from the lips of one entomologist to another, as they are picking to pieces the scientific character of a mutual acquaintance. You may wonder how the individual speaking differs in his manner of entomological work, from the individual of whom he is speaking, but courtesy forbids asking for an explanation. We have roughly four classes of entomologists:—

(1). Those who collect the beautiful insects they admire, set them out more or less carefully, and preserve them, make observations which tend to self-improvement, but have insufficient education or insufficient time to draw deductions from their observations, or to record them for the value of others.

(2). Those who fulfil most of the preceding conditions, and in addition, draw more or less satisfactory or unsatisfactory deductions from their observations, and record the latter in a more or less satisfactory or unsatisfactory manner for the mutual benefit.

(3). Those who know nothing about collecting, but who, using the observations of others, make books that very few read, compose lists to "muddle" the collector, and describe species from odd specimens obtained in far away countries by paid collectors, the said species probably being—in nine cases out of ten—different sexes, or local vars. of the same species; such people of course considering themselves the cream of those who label themselves "scientists."

True science correlates facts, and makes fair deductions from careful observations. How those, who do not collect and do not make observations, can possibly draw correct deductions, I am at a loss to imagine! But there is a fourth group of men who are totally distinct from those in Class 3, who collect, or have collected themselves, who write books recording their own observations, advance our study generally, and who are "scientists" in the true sense of the word. I need hardly particularise, but Messrs. Stainton and the late Edward Newman were both active collectors; Mr. McLachlan, who has done so much for the Neuroptera and Trichoptera, and Mr. Verrall for the Diptera, have also been active "collectors."

Why then should the term "collector" be considered such a disparaging one? Is not the man who makes observations for himself improving himself, and thus benefiting the community? Is not the man who collects insects, and makes observations, and gives both the insects and observations to those who have more time and a better opportunity for using them, a scientist in the truest sense? Is not every brother of the net who does this doing his share towards the one great whole, on the principle of "Little drops of water," etc.?

But I would ask those who despise the collector one practical question: What would they do without him? How long would it take one man to write a book only like Newman's *Butterflies*, without the aid of the collector? Could it be done in a lifetime? I think not. The real collector is a scientific force in our study, and a most valuable unit too.

For the mercenary collector who collects insects like a man collects old "pots" in an auction room, or for the business-like man (?) who offers you *Lycæna alexis* or *Chrysophanus phlæas* for some rare species, which have cost you time and money, and who does not consider he has done a day's work unless he feels he has "had" you, the poorest and most illiterate collector has the heartiest contempt in common with his more educated brother. Some of our best collectors and best observers are working-men, who could not translate a line of German, and have never seen the inside of a Latin grammar, but they may be "scientists" for all that, although they are "collectors."—J. W. TUTT. *June*, 1890.

SESIA SPHEGIFORMIS IN ESSEX.—On June 16th I captured a fine freshly emerged female of *S. sphegiformis* in Essex. It was quietly resting on an alder leaf. My friend, Mr. Thurnall, took one in the same locality two years ago.—J. A. COOPER. *June*, 1890.

SESIA ALLANTIFORMIS IN KENT.—I captured a specimen of this rare *Sesia* crawling over privet blossom in a well-known locality in Kent. The specimen had one of the posterior wings malformed, and attached by some means to the leg, so that it is more interesting than beautiful.—J. W. TUTT. *July*, 1890.

NOTES OF THE SEASON.—LEPIDOPTERA.—I find insects are not very plentiful with us at York yet. I was at Bishop's Wood, ten miles from York, on Monday last, when I captured the following imagines:—*Asthena luteata*, *A. candidata*, *Eupisteria heparata*, *Cidaria silaceata*, *Abraxas ulmata*, *Platypteryx falcula*, and *Argynnis euphrosyne.* Besides these I obtained a number of larvæ from oak, birch, and poplar, amongst others about 60 *Tæniocampa populeti*, almost full-fed from aspen (this species is some 8 or 10 days earlier than in previous years). I also think I have larvæ of *Tethea subtusa*, but it is difficult to separate this species from *T. populeti.* Newman says they spin two leaves together, but I am under the impression that *subtusa* spins up on *one* leaf, merely turning over one side of the leaf. I should be pleased to have information of this matter.—R. DUTTON, York. *June 4th*, 1890.

The weather here has been altogether unfavourable for collecting—cold nights, and during the past week cloudy days. Sugar has so far produced absolutely nothing. By heating, a few things have been obtained—*Acidalia remutata*, *Asthena candidata*, and *Iodis lactearia*, commoner than usual; on the other hand, *Ephyra omicronaria*, and *Numeria pulveraria* have been very scarce for this district. I have known the time when the former came out at almost every stroke of the beating stick. I have taken a few *Minoa euphorbiata*, but this species likes hot sunshine, of which there has been a lack. *Melitæa artemis*,[1] sometimes very abundant, I have not seen; either it is very late or absent this season. *Procris geryon*, last year so abundant, I have not observed, possibly the absence of sunshine will account for this. *Leucophasia sinapis* has been fairly common, but *Lycæna argiolus* unusually scarce. I hope an improvement will soon be seen.—(Rev.) E. C. DOBRÉE FOX, Castle Moreton Vicarage. *June 7th*, 1890.

Up to the present sugar has been a blank, but the Geometrina are more plentiful than usual. I have taken *Nola cristulalis* in two localities, from which it has never before been recorded, and I hear that in a favoured wood in Shropshire the same species has occurred very freely this year. These insects need careful looking for on tree trunks, and I believe are most generally abundant in the afternoon.—M. KIMBER, Cope Hall, Newbury. *June 12th*, 1890.

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[1] Mr. Herbert Goss, F.L.S., told me *P. geryon* was out in large numbers at Lewes on the Tuesday in Whit week, and that *M. artemis* was very abundant in Gloucestershire a very little later.—ED.

I had a splendid night's collecting with light last week, taking, amongst other species, 4 *Aplecta tincta*, 1 *Notodonta dictæoides*, 1 *Asphalia fluctuosa*, several *Euthemonia russula*, and *Macraria notata*, etc.—A. ROBINSON. *June 18th*, 1890.

I was out yesterday, and took, among other things, 3 *Eupithecia pygmæata*. I understand *Hadena adusta* and *H. rectilinea* are appearing; I used to take both very abundantly near here.—W. REID, Pitcaple. *June 15th*, 1890.

I have been to Cuxton, but failed entirely in finding larvæ of *Rhodophæa suavella;* but near Halling *Euchelia jacobææ* was in great abundance. I have taken many *Lycæna adonis* and *alexis*, but the early broods are nearly over. *Scoria dealbata* is rather commoner than usual, I took sixteen fine specimens on one day.—J. TYRER, Jeffery Street, New Brompton, Kent,

I was in Arran from Saturday to Monday last, and brought home some 120 or more specimens, including *Eupithecia pumilata*, *E. nanata*, and two other species of *Eupithecia*, *Scodiona belgiaria*, *Coremia unidentaria*, *C. propugnata*, and many common species, including *Fidonia atomaria*, of which we got some very fine varieties. I also got numerous small "fry" not named yet. I believe Arran to be one of the most prolific collecting grounds in the British Isles.—A. STEWART, Ferguslie, Paisley. *June 17th*, 1890.

I was out during April for *Tephrosia crepuscularia*, but they were comparatively scarce. I took a few from larch trunks in fairly good condition, but the high winds had blown a good many down and destroyed them. *Cidaria suffumata* is in great abundance everywhere, but the dark variety (*piceata*), which generally occurs, I have not seen this year.—J. WYLIE, Perth. *May 22nd*, 1890.

On the 18th May I was at Benfleet, and had the pleasure of taking my first larva of *Phorodesma smaragdaria*. I little thought, when I picked up what appeared to be a few withered leaves, that I had picked up a caterpillar, so perfectly was it concealed. Near Canvey, on the 25th, I found larvæ of *Lasiocampa quercifolia*, and a nest of *Eriogaster lanestris* on hawthorn; also three nests of the latter species at Southend on blackthorn. At Shoeburyness, on the 26th, I found a nest of the larvæ of *Bombyx castrensis*. *Hyponomeuta padellus*[1] larvæ are quite stripping the blackthorns in this neighbourhood.—F. G. WHITTLE, 6, Lothbury, E.C *June 4th*, 1890.

Yesterday (June 24th) I took part in a very enjoyable excursion of the Entomological Section of the Bristol Naturalists' Society to some attractive and picturesque country in the neighbourhood of Dursley, Gloucestershire. Upon the hills *Lycæna alsus* reigned supreme in point of numbers; *Thecla rubi* was present, though rather worn; a fair number of specimens of *Nemeophila plantaginis* were seen and captured, all in grand condition; *Procris geryon* occurred, though rather sparingly, and past its best, whilst *Euclidia mi* and *E. glyphica* were also captured. *Hesperia sylvanus*, *Lycæna agestis*, *Acidalia aversata*, and *A. remutata* were in more or less abundance, whilst other captures included *Cidaria silaceata*, *Hecatera serena*, *Plusia pulchrina* and *Phytometra ænea*. Amongst larvæ a few *Nudaria mundana* were found, whilst the larvæ of the two plumes *Pterophorus phæodactyla* and *Aciptilia galactodactyla*[1] were in great abundance.—G. C. GRIFFITHS, Clifton, Bristol. *June 25th*, 1890.

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[1] This species is swarming everywhere in the immediate neighbourhood of Westcombe Park. The hawthorn hedges are in many places leafless from its attacks.—ED.

I have found the commonest NOCTUÆ very plentiful at sugar, but Geometers have been very scarce. I have obtained a good series of *Agrotis ripæ*, but I was late in finding them, and half those I looked over were too worn to be worth setting. I found *Mamestra albicolon*, too, at the same time, rather plentifully, but almost all worn; I took several pairs *in cop.* however, and have ova, so that I hope to breed it. —E. W. BROWN, Portland. *June 21st*, 1890.

Orgyia fascelina has been very abundant in Aberdeenshire this season. Mr. Esson and myself have taken large numbers, both of larvæ and pupæ, the former being much more abundant in the evening than in the daytime. I have never known them to be so abundant in this locality before.—J. NICOL, Aberdeen, N.B. *June 27th*, 1890.

Channel Islands.—On May 29th I left London for a week's stay in Guernsey on business, hoping, however, to do a little collecting. This I did, but found few species in any abundance, with the exception of *Melitæa cinxia*, which seems so fairly established in the Channel Islands that I trust it may never become so scarce as it has become in the Isle of Wight. On my arrival at Guernsey I found the winds very cold, and the weather looking anything but promising, so I made up my mind to do my business first. On the following Monday I started for Sark, where I stayed a few days. Whenever there was a little sunshine I invariably found abundance of Diurni, of which the most abundant were *M. cinxia*, *Pararge egeria*, *mægæra*, *Lycæna alexis*, and *Thecla rubi*, the last-named being very abundant but much worn. *Lycæna argiolus* was unusually scarce; *Aspilates citraria* were fairly plentiful one afternoon on the cliffs; but the following night was wet, after which I found this species had completely disappeared. As regards *M. cinxia*, although distributed all over Sark, yet it is far more plentiful in certain small localities than in others seemingly similar; in Guernsey it is very local indeed, and, excepting in one or two spots, is, I believe, becoming rarer there. I am indebted to the courtesy of Mr. Luff for my knowledge of one locality in Guernsey where it abounded. As far as my observation goes, there seems to be a continuance of emergences from middle of May till nearly the end of June, so that fresh specimens are almost always to be had. The ♂ seems, as a rule, earlier than the ♀. Owing to the great lack of sunshine, I could not observe the flight of this species as much as I could have wished, but noticed that early in the day the males seemed particularly fond of leaving the upper steep flowery slopes of the cliffs, which are their usual haunts, and frequented the hottest parts of the hollows, especially delighting to settle upon the dusty road, and were easily caught. Later in the day they return to the cliffs and fly about the flowers, often settling and expanding their wings. Towards evening they were especially partial to the higher heads of blossom, especially selecting those of the dog-daisies. Sugar was duly tried, but was entirely unproductive, with the exception of one *Tæniocampa stabilis*, in good condition, although so much behind time. Trunk searching produced a few *Nola confusalis*, if my memory serves me, upon trunks of ash trees. As I have never met with this insect before, I am unable to say whether it is of unusual occurrence in the Channel Islands.—ALBERT J. HODGES, Isle of Wight. *June 27th*, 1890.

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[1] Specimens reared from larvæ sent from Reading, by Captain Robertson, were off *the boards at this date.*—ED.

Insects seem to be very early in the neighbourhood of Epping Forest. On May 13th I took *Panagra petraria*, *Numeria pulveraria*, and saw *Lycæna argiolus* in large numbers; I also found larvæ of *Bombyx quercus* feeding on blackthorn. I also took the week following this date, *Drepana cultraria*, *Eurymene dolabraria*, at rest on oak, a fair number of *Lycæna argiolus*, and four *Nola confusalis* at rest on oak and hornbeam. May 15th seems to me an early date for the latter species.—W. MACKMURDO. *May 19th*, 1890.

I have found this season so far very good. I found but few spring moths, but have been kept busy with larvæ. May 20th I spent a few miles from this town, and took from heather larvæ of *Noctua neglecta*, *Agrotis porphyrea*, *Plusia interrogationis*, *Larentia cæsiata*, *Cidaria russata*, *Bombyx callunæ*, and *Nemeophila plantaginis*, but did not find *Liparis fascelina*, which usually occurs there. In the evening "sugar" was useless; I netted *Eupithecia indigata*, *Coremia ferrugata*, *Spilosoma fuliginosa*, *Bombyx rubi*, *Cidaria suffumata*, and its var. *piceata*. On June 21st I was out "sugaring" on the moors here, and had splendid sport. I took *Acronycta* (*Viminia*) *myricæ*, *A. menyanthidis*, *Hadena adusta* (abundant), *H. suasa*, *H. rectilinea* (commoner this year than I have seen it since 1882), *Rusina tenebrosa*, *Apamea rurea* and vars., *Thyatira batis*, *Agrotis suffusa*, *Apamea basilinea*, *A. didyma*, *Caradrina cubicularis*, *Mamestra gemina*, *M. anceps*, *Noctua plecta*, *Agrotis porphyrea*, and many others. Among Geometers I took *Macaria liturata*, *Boarmia repandata*, *Eupithecia pumilata*, *E. satyrata* var. *callunaria*, *E. lariciata*, *E. nanata*, *E. pulchellata*, *Cidaria corylata*, *Larentia pectinitaria*, *Coremia ferrugata*, and very many other species. From the heath I gathered a few cocoons of *Dasychira fascelina*, *Plusia interrogationis*, and *Nemeophila plantaginis*, together with larvæ of *Trichiüra crataegi* and *Larentia cæsiata*. Altogether I had good sport, and have never seen insects more plentiful than they are this summer. The prospects are certainly encouraging. I hope my southern friends are finding it the same.—A. HORNE, Aberdeen.—*June 23rd*, 1890.

The season here is very encouraging, larvæ in some cases seem superabundant. *Fascelina* has been much more common than usual. For imagines the east winds have been unfavourable, but several Micros have occurred abundantly, among others, *Elachista argentella* and *Chorentis scintillulana*. *Leucania littoralis* has already appeared.—H. BAXTER, S. Anne's-on-Sea. *June 24th*, 1890.

I went out yesterday on the cliffs after *M. cinxia*, and have pleasure in sending you the result. It is curious that nearly all my captures were females, most of the males, some *in cop.* with fresh females, were in very battered condition, although I did not see a worn female. I found a healthy larva still feeding on the cliff, which I enclose.[1] I do not remember taking larvæ so late before. I also enclose the first specimen of *Hipparchia semele* I have taken this season.—W. A. Luff, Guernsey. *June 22nd*, 1890.

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[1] *This has since disclosed* a batch of ichneumon cocoons.—ED.

Since I have been here the weather has been most unsuitable for collecting, I have taken *Hydrelia unca* and *Selenia lunaria*, and tried sugaring once, when I obtained *Grammesia trilinea* var. *bilinea*. I forgot to mention that I took in two nights 14 specimens of *Chærocampa porcellus* and 2 *C. elpenor* hovering over rhododendrons. I saw dozens, but they were too quick for me.—R. B. Robertson, Skelty Park, Swansea. *June 18th*, 1890.

Coleoptera.—Beetles have been as abundant as usual here. Moss is usually very productive, and was quite up to the average this season. From the Mullinare meadows, which are low and marshy, I took *Bembidium Clarki*, *Quedius semiæneus*, *Mycetoporus splendidus*, *Megacronus cingulatus*, *Hypocyptus pygmæus*, *Myllæna brevicornis*, *Lathrobium longulum*, *Scymnus discoideus*, *Trogophlœus foveolatus*, with hosts of commoner species. In moss and fungi from Palace Demesne, *Amara ovata*, *Simplocaria semistriata*, *Philonthus sordidus*, *P. puella*, *Encephalus complicans*, *Lathrimæum unicolor*, *Megarthrus affinis*, *M. depressus*, *Proteinus ovalis*, *P. brachypterus*, *Acidota crenata*, *Micropeplus staphylinoides*, *Quedius semiæneus* and *Q. attenuatus*, *Syntomium æneum*, *Agathidium lævigatum*, *Gyrophæna lævipennis*, *Lathrobium fulvipenne*, *Philonthus intermedius*, *P. umbratilis*, *Rhizophagus dispar*. At Lowry's Lough, in moss and rejectamenta on margin, *Lathrobium quadratum*, *Philonthus dimidiatus*, *P. fumarius*, *P. nigrita*, *P. puella*, *Actobius cinerascens*. I have been unfortunate in not getting any *Erirhinus æthiops* this spring. It has occurred in the Mullinares in numbers in former years, but so far I have not seen one this year. *Pelophila borealis* is late this season, and I have not as yet taken any. Sweeping has not been very productive, nor did I get anything worth recording by beating hawthorn blossom. The water net procured me *Agabus unguicularis* at Lowry's Lough, in company with *Cœlambus quinquelineatus* and *novemlineatus*.—(Rev.) W. F. Johnson, Armagh. *June*, 1890.

My opportunities for collecting, so far, have been few. On May 10th I visited my old friend, Mr. W. Chaney, and we proceeded to Shirley Hills in search of *Tychius venustus*—a species formerly obtained there by Mr. G. C. Champion. This insect is attached to broom, and to this shrub we devoted our energies, with the result of capturing some ten specimens between us. Other species here prevalent were *Sitones regensteinensis*, *Gonioctena litura* (some exceedingly lurid), *Apion striatum*, and *Cryptophagus vini*. I also beat out one *Balaninus villosus* from oak.

May 17th and 26th.—Hawthorn blossom fully out, and I tried Loughton for species of *Rhynchites*. *R. æquatus* was common, but *R. aliariæ* and *R. pauxillus* were scarce, only some three or four of either insect found their way into my umbrella. Of *Adimonia sanguinea* I obtained sixteen, *Asclera cærulea* (2), and *Anthonomus pedicularius* (6); and swept a couple of *Galeruca tenella* from rushes, and *Apion genistæ* and *Strophosomus retusus* from *Genista anglica*; from oak I beat *Cœliodes quercus*, *C. subrufus*, *Orchestes salicis*, *O. avellanæ*, *and O. stigma.*

May 24th.—Accompanied by Mr. Cripps I went to Oxshott, by way of Surbiton and Claygate. By general sweeping in grassy places and meadow land, I captured *Rhinoncus inconspectus* and *Ceuthorhynchus campestris* (9); also one each of *Clerus formicarius* and *Callidium alni;* at hawthorn, *Polyopsia præusta*, and saw one *Mordellistena abdominalis*, which, unfortunately, made its escape; I also got one or two *Rhynchites æneovirens* from oak.

June 7th was a glorious day. At the same locality we obtained several *Grammoptera tabacicolor* by sweeping *Umbelliferæ;* Mr. Cripps also captured a fine *Agapenthes sanguinicollis*, and one *Opillo mollis*. Other captures were *Anobium fulvicorne*, *Exocomus 4-fasciatus*, *Liophlœus nubilus*, *Anchomenus gracilis*, and *Donacia menyanthidis*.

June 21st.—Took train to Higham, principally in search of *Malachius æneus*, which occurs at this time on *Dactylus glomerata*. Last year I obtained some thirty or forty, but on this occasion I netted seven only. This insect is very uncertain in making its appearance, sometimes one may meet with a fair number, and then again not see it for years. I have previously taken it at Sunbury and Rainham (Essex). At the latter locality I once found fourteen, but have not caught a glimpse of one since. Making my way to the wood, I swept *Chrysomela varians*, *Agrilus augustulus*, *Campylus linearis*, *Erirhinus maculatus*, and the pale form *Silbermanni*. Being kindly directed to a dead hedgehog, I procured several *Silphidæ* and *Saprinus nitidulus*. Rain set in, and I retired early.—G. A. LEWCOCK, 73, Oxford Road, Islington, N. *June*, 1890.

HABITS OF THE LARVA OF NONAGRIA GEMINIPUNCTA.—In my own early collecting days it was my erroneous idea that it was useless to work for any of the NONAGRIDÆ excepting in the Fen district, and as there may be other lepidopterists who are of the same opinion I thought a few notes on the best way to work for the larva of *N. geminipuncta* would be read with interest.

In the first place I may say that the imago is but seldom taken owing to its sluggish habits and to the extreme difficulty of working its chosen haunts after dusk. The best way, therefore, to obtain a good series, amongst which well-marked varieties will always occur, is to obtain it either in the larval or pupal stage, and as this species spends but a comparatively short time in the latter, it is perhaps better to obtain the full fed larva.

The locality desired must of necessity be marshy, as the foodplant is the common reed (*Arundo phragmites*)*;* and from experience I have found that tidal estuaries are among the most likely places in which to find this very local species, and further, that the finer and more luxuriant patches of reeds, growing, it may be, in some actual dyke or water-course, will better repay search than possibly larger areas of less well grown plants in dryer situations. This, of course, adds materially to the difficulty and consequent pleasure of obtaining the species.

The best time to search for traces of the larvæ is about the middle of July or rather earlier, the effects of their internal feeding then beginning to be readily apparent in the brown and withered appearance of the youngest or top shoots of the reeds; this is a ready method of discovering a new locality, after which, to make sure, the affected reed should be examined, when a small circular hole will be found, pierced by the young larva in its wanderings from one stem to another, or even from one joint to another of the same stem, the hard joints in the stem not allowing it a free passage. Should, however, the search be postponed too long, the quicker growth of the healthy reeds overtops the stunted and withered stems in which the objects of our search are concealed, and renders the detection of a new locality a much more difficult matter.

When, however, a locality is known, it is quite unnecessary to cut the reeds before the last week in July, when it will be found, as a rule, that only the larger stems contain larvæ, which often appear even when full fed, to wander and attack fresh ones, evidently in search of more roomy quarters in which to pupate. When searched for at this time it may be seen at once with certainty which reeds are tenanted, as the full fed larva prepares for itself a means of exit by eating its way through the inner coats of the stem, leaving only the thinnest outer skin, which may be called the "sheath" or "case," and has a whitish and transparent appearance, is of an oval shape, and very easily detected.

The larva does not pupate for some little time after preparing the "case," but may then be considered as full fed. In cutting the reeds it will be found that the "case" is almost always in the lower and stouter joints of the reed, and care must be taken to cut the stem under the next joint below the "case," as otherwise the pupa is likely to slip out and be lost, or where this does not happen, the cut section of the reed soon shrivels, often killing the enclosed larva or pupa by compression, even if stood, as they should always be, in sand and water, and kept continually damp. As soon, however, as the larva has pupated, it is the best plan to split the reed with great care, especially when near the "case," which will fairly indicate the position of the pupa (it being mostly found a few inches above the "case") and take out the pupa or pupæ, of which two and occasionally three are found in the same stem, and even in the same joint, laying them on very damp moss, when the imago will emerge in two or three weeks. This process, if carefully performed, results in the proportion of "cripples" being very small. Should the reeds be cut too early, even although kept very damp, the larva is apt to wander towards night from its food, doubtless seeking for more healthy plants, but if put back upon the reeds, usually gnaws its way in again, causing a very audible sound during the operation.

The imago invariably emerges in the early evening, generally between 6.30 and 8.30 p.m., and crawling up the reeds to expand its wings, very rapidly develops; it is well not to kill them too soon, as the wings are for some time extremely flaccid and the insect consequently difficult to set.—ALBERT J. HODGES, 2, Highbury Place, N.

NOTES ON EPUNDA LICHENEA.—*E. lichenea* is found at Portland very plentifully in the larva state, but although common in this stage I have only taken eight imagines in two seasons, viz., two in 1888, boxed off grass when drying their wings, and six in 1889, three at sugar and three at ivy.

The larvæ I find from the middle of February to end of April, on *the top of grass* stems, generally in little colonies of five or six, in sheltered spots at the foot of banks, beside large boulders, or in crevices of the rock. There is no ragwort where I have taken them, but I have seen a few on this plant in other places. I fancy they feed on a variety of low plants, but the larvæ I have taken have always been at rest—never feeding. Last season I bred seventy on chickweed without losing one, and they had all gone down by the 10th May; those taken late in April feeding up very rapidly. This year I am rearing a batch on groundsel, and they are all doing well, some having already (14th April) gone down.

I take them when small, about nine lines in length, and being then of a vivid green they are easily seen at night on the grass stems; some being stretched out flat, and others resting with the head and fore part of body tucked inwards, and looking somewhat like a note of interrogation (?). They are best searched for when small and green, as, later on, they entirely change their habits, and no longer rest on the grass stems, but remain concealed at the roots of low plants, and are then hard to find. I have taken over 200 in the green stage, but have not found more than half a dozen after they had assumed their mottled olive suit, as described by "Newman." They fall off the grass at the slightest touch, making it necessary to hold the lid of the larvæ tin underneath to catch them.

Of the seventy I bred last year the first imago did not emerge until 11th September, and they continued to appear daily until 16th October, with one late straggler on 27th October. The greatest number on one day was seven, on 3rd October. I tried two couples, and found they paired readily when placed in a roomy glass-topped box, with a small quantity of honey. I placed them together on 23rd September, and by the 26th the ♀'s had each deposited some 200 ova on the loose paper lining the sides and bottom of the boxes. The ova changed to green on the 18th and hatched on 26th October, but on trying to bring the larvæ through the winter—keeping them in a warm room—I was not successful, all dying off by 20th February. When about half grown the larvæ cease to be green, and for some three or four days after this change of skin, after assuming their darker markings, they vary much in colour. When full grown, however, I do not find any variation.—E. W. Brown, Portland. *April 14th*, 1890.

Notes on Dasycampa rubiginea.—I was very pleased with Mr. Mason's article on *rubiginea*, with which insect I have had a little experience, having taken it at ivy bloom, sugar, sallow and light, but never in such numbers as he seems to have done, though I notice that he took his 17 in '85, before I began to collect, which was in June '86. However, I have taken about 24 since '87. In the spring of ,88 I was lucky enough to get 7 at sallow and sugar, and 4 in '89, and succeeded in getting ova both years, though it is a very difficult matter to induce the ♀ to deposit her eggs. I have kept the insect alive for a month, by feeding it on honey mixed with a few drops of sherry. I placed all those captured in the spring in a bandbox with muslin cover; inside I put twigs of apple, which I had scored with a knife, as the ♀ seems to like a niche to deposit her eggs in, which she lays singly. I don't know how many ♀ ♀ I had, as I could not distinguish the sex, but the first egg was laid on April 20th, a week after capture of first insect. I may here remark that all my spring captures were not in such good condition as Mr. Mason's, otherwise I am afraid I should have been tempted to kill them, as "a bird in the hand is worth two in the bush;" after the 20th I had two or three eggs a day, though sometimes they stopped laying for a day or two when the nights were extra cold, (I kept the bandbox indoors). I got about 30 ova altogether in '88, which began to hatch about 20th May. The ovum is shaped like an orange, with depressed top and ribbed, milk white when first laid, pale straw colour two or three days after, and turns a salmon pink before hatching, with black ring on top, or rather right round it, the young larva is brown and hairy with minute black spots on each segment in centre of back; after first moult the spots become larger, and the hairs assume a reddish tinge, the body being brown. I fed mine on apple, standing them at first in a glass bell filter, and afterwards sleeved them on an apple tree, on which was unfortunately a *Trapezina* larva unnoticed, which demolished six or seven before I discovered him; however, I succeeded in getting 19 into the pupal state, but, oddly enough, I had 20 imagines emerge, so must have dug up the odd pupa at some oak or other tree, as I generally keep my bred and dug pupæ in same box for convenience sake. Mr. Hewett, of Winchester College, bred some the same year, and, I think, fed his exclusively on dandelion, with which plant I tried mine at first, but they did not seem to take kindly to it, forsaking it for the apple. The larvæ were full fed about last week in July, and began to emerge on Oct. 5th. In spring '89 I took four at sallow, and got about three dozen ova, two dozen of which I divided between Mrs. Hutchinson and Rev. B. Smith. I was pleased to hear that the former succeeded in rearing nine, and sorry to hear that the latter failed utterly, I managed to get seven into pupæ, all of which emerged between Sept. 24th and 30th. They seem to be extremely local, for although I have tried for miles round, I have only taken them within radius of 200 or 300 yards. I have only once taken anything approaching a variety, and that had black band parallel to costal margin. I have been after it this year, but failed to take it.—R. B. Robertson, Calcot, Reading. *June*, 1890.

Retarded Emergences.—Referring to Mr. Baxter's note (*ante* p. 23), I may mention that last season (1889) I had several *Smerinthus tiliæ*, which had passed two winters in the pupa state. I also had the following species: *Notodonta dromedarius* (several), *N. camelina* (about a dozen), *Eupithecia pygmæata* (2), *E. linariata* (3). There was certainly nothing exceptional as regards heat last year to account for these appearances. I am inclined to believe this practice of lying over is the rule among the Macro-lepidoptera (moths), and not the exception; I am constantly meeting new cases.—C. Fenn, Eversden House, Burnt Ash Hill, Lee, S.E. *May 12th*, 1890.

In August, 1888, I took a few full-fed larvæ of *Cucullia verbasci*, which went down at once. Four or five came out at the usual time last year, but two others emerged on the 3rd inst. The wings of one did not expand properly, but the other is a fine specimen.—A. F. Bayne, 85, Palmerston Buildings. *May 12th*, 1890.

In 1888 I bred 19 larvæ of *N. trepida;* they all pupated on the same day, and in January, 1889, I put the pupæ in a small forcing-house I have in one of the hottest parts of a hot-house. Some of these insects emerged last May, but 11 of them remained in the pupal stage. During the summer they were in the forcing-house in the driest possible soil. Many days in the summer the heat was intense, and I never expected my *N. trepida* to appear. However, on March 17th, 1890, 2 fine males emerged, and since then the other 5 have come out, all of them fine specimens.—M. KIMBER, Cope Hall, Newbury. *April*, 1890.

Miss Kimber's note on forcing *N. trepida* is very interesting. I wonder how we can find out the exact point which determines whether an insect will come out at once or wait for another twelve months for the purpose. I suppose the matter must be determined some time before the insect emerges, because a pupa usually changes colour, etc., before this, and those which stay over have only their normal appearance. It occurs to me whether any amount of forcing could have brought out these pupæ in the summer. It seems doubtful if it would, but perhaps a moist heat might have affected them. This spring I had about four dozen pupæ of *Asphalia ridens*, but only nine have come out, the rest are clearly going to stay over.—A. ROBINSON, Lambeth Palace Road. *April*, 1890.

This spring I have had four fine *Cuspidia (Acronycta) tridens* emerge, after having been two years in pupa. I took the larvæ the first week in July, 1888, and quite thought they were dead. I also had several *Saturnia carpini* emerge, after being three years in the pupal stage.—T. W. KING, Purbrook, Dorking.

I have had a *Bombyx quercus* lie over two seasons and then produce typical *quercus*, not var. *callunæ*, in the early spring. Of six pupæ of *Eupithecia togata*, five emerged in May, 1888, one not till May, 1889. I have frequently had *Pygæra bucephala* emerge after two years in the pupal stage. I cannot find the least clue as to why some should remain in the pupal stage longer than others that have been subjected to exactly the same treatment.—W. DAWS, Mansfield, Notts.

I have bred a series of *Eupithecia venosata* from pupæ received from the Isle of Man, which have been two years in the pupal stage.—J. WELLMAN. *June*, 1890.

[For cases of retarded emergence in the genus *Acronycta* see Dr. Chapman's article in the current number.—ED.]

HABITS OF THE LARVA OF TETHEA RETUSA.—I would suggest to entomologists, who find the larvæ of *Clostera reclusa*, not to overlook the larvæ of *T. retusa*. They fold a leaf or two of sallow round them much after the manner of *C. reclusa*, and the larvæ themselves much resemble those of *Epunda viminalis*.—M. KIMBER, Cope Hall, Newbury.

EUPITHECIÆ ON JUNIPER.—Whilst collecting with my friend Mrs. Bazett last week, we beat a quantity of larvæ of *Eupithecia sobrinata* from junipers on the chalk hills near here. Among the two varieties of this larva (dull green and light green, with a series of pink dorsal markings), we found a fair number of brown larvæ with darker dorsal markings. Apparently these are some *Eupithecia*, but we could find no account of such larvæ. Can any one tell me if this is a variety of *E. sobrinata*?—ID. *May 19th*, 1890.

ABRAXAS ULMATA NEAR CHATHAM.—Twenty years ago I first took this species near Chatham, and have this month taken other specimens. More than fifty years ago I took this species in dozens in the neighbourhood of Bewdley (at Ribbesford Wood), but the southern locality seems to make it worthy of record.—J. TYRER, Jeffery Street, New Brompton. *June 17th*, 1890.

EPHESTIA KÜHNIELLA IN ITS SETTLEMENTS.—This species has not been plentiful in the bakery here this year, and it has taken me some time to get a dozen or so specimens. The bakery is kept so clean and the walls so constantly brushed down and limewashed, that no doubt the larvæ are disturbed and destroyed. Where flour dust collects in corners and beams not easily got at, there the larvæ are at home, feeding in a silken gallery, afterwards spinning a neat little cocoon on the faces of beams, bricks, etc., sometimes two or three in a cluster. There is no doubt that the species is now common in most granaries and flour-mills.—J. A. COOPER, Leytonstone. *May 30th*, 1890.

NAMING HEMIPTERA.—Can you refer me to any friend of yours who would be willing to name any of my HEMIPTERA, that I am in doubt about? I have Douglas and Scott's book, but I believe some of our species do not occur in Great Britain.—W. A. LUFF, Guernsey. *June 22nd*, 1890.

[I trust some of our readers will be able to help Mr. Luff.—ED.]

ACRONYCTA ALNI.—I have succeeded in rearing a male of this species from a larva found last August upon lime at Bloxham, near Banbury. The larva was full-fed when captured, and pupated a day or two afterwards. I may mention that in 1887 a larva was found at West Woodhay, near Newbury, upon rose, but this one died before effecting its transformation.—J. H. D. BEALES, Arthur House, Margate.

EUPITHECIA EXTENSARIA.—I am now breeding a nice long series of *Eupithecia extensaria* from larvæ I collected on the Norfolk coast at the end of August last. Two ♀'s enclosed over potted growing plants of *Artemisia maritima* are busily engaged depositing eggs.—GEO. T. PORRITT, Huddersfield. *June 19th*, 1890.

NOTES ON XANTHIA CERAGO AND X. SILAGO.—It may be of interest to you to know that my experience of collecting the above-named insects in 1888 and 1889 exactly coincides with that of Mr. Hodges (*Record*, No. 3, p. 68). In September, 1888, I took a specimen of *X. silago* on a head of long grass in a field in an exposed situation, and on further search found over a score of this species and *X. cerago;* on the succeeding night again I found several more, all being in excellent condition. Last autumn, 1889, I searched the same field, and, like Mr. Hodges, met with no sign of either insect. I may mention that there is no sallow in the immediate vicinity.—JOHN E. EASTWOOD, Enton Lodge, Witley, Surrey.

NOTE ON GNOPHORIA CRIBRUM.—I had the good fortune to meet with *G. cribrum* this month for the first time. I find that it appeared on the wing about 15th June. Theodore Wood, in his *Field Naturalist's Handbook*, mentions July and August as the proper time of appearance, whilst other lepidopterists say that *G. cribrum* is double-brooded; but although I went after it last August I did not see a sign of one. I met with this insect on heathy ground on the Wimbourne Road. In places the ground is covered under the heath with a ground lichen, which I was informed was the foodplant. The only time to find this insect is when the sun is out, when they have to be beaten out of the heath, and as they ascend must be caught with a swift stroke of the net, as it appears impossible to see where they fly to, appearing to pass clean out of sight, something after the manner of *Bombyx rubi.* I fortunately succeeded in getting ova, which were, when magnified, exactly of the appearance and colour of shot. The young larvæ have just hatched, but do not appear to take to the lichen at all. I am afraid it is a mistake to say this is the foodplant.

I sugared in the New Forest, but the result was *nil;* neither were any larvæ to be beaten, except those of *Trachea piniperda.*—W. DANNATT, Westcombe Park. *June*, 1890.

[See Mr. Tugwell's remarks on this species in the "Practical Hints" for this month. The Rev. J. Seymour S. John gives heath, *not* lichen, as the foodplant.—ED.]

RETINIA RESINANA IN ABERDEEN.—I notice that Mr. Horne (*ante*, p. 64) records the capture of this species some miles out of Aberdeen, and that "the species does not appear to be found in the immediate vicinity of Aberdeen." I captured the species in Aberdeen last year.—L. G. ESSON, Aberdeen, N.B.

PEACH AND NECTARINE BLIGHT.—A well-known naturalist writes privately to me:—"It is scarcely possible to decide, without seeing specimens, the nature of the peach-leaf blight mentioned by Mr. J. Anderson at p. 66 of the *Entomologist's Record.* As he cannot detect any insects at work it is possibly the work of a fungus, *Ascomyces deformans*, B., which causes injury by blistering the leaves" (*in litt.*)—J. W. TUTT. *June*, 1890.

KILLING LEPIDOPTERA.—I have tried almost every method known, and probably some not often used, for killing insects, but never found anything so effectual and pleasant to use as ammonia. It kills the insects without damage, renders them delightfully flexible for setting, and does *not* damage the colour of the greenest,[1] or other tinted insect, provided the proper ammonia be used, which should be the best and strongest procurable. The best for the purpose is *Ammonia Hydrate* NH_4HO.

I open the lids slightly of the boxes, arrange them round a small vessel containing the ammonia, place a suitable cover over them, such as a glass shade for ferns, or a wash basin, and leave for half-an-hour, when they will be found quite dead and perfectly fresh and pliable. In fact, this extreme pliability in setting after being killed with ammonia is the greatest argument in its favour.

When necessary to kill specimens late at night, arrange the boxes containing the insects and cover them as described above, then place a damp towel around the junction of the cover with the table, thus rendering it perfectly air tight, and leave until morning, when the insects will be found dead, and delightfully fresh and easy to set.

I trust whoever may be tempted to try this method, will find it as successful as I have done, and I doubt if anyone, having given this a fair trial, will adopt any other plan.

They can be killed in the field, when necessary, with an ordinary cyanide bottle, a sponge soaked in ammonia taking the place of cyanide, and a couple of layers of perforated zinc (the lower one being on the top of the sponge, and the next a little higher up to avoid the wings touching the ammonia) taking the place of the plaster of Paris.—A. HALL, Newbury, Sheffield, *May*, 1890.

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[1] But it does, though some greens are very little affected. Try it on *prasinana.*—ED.

My "modus operandi" in killing Lepidoptera is in most cases the cyanide bottle, prepared in the following manner:—Cyanide of Potassium 1 part; Plaster of Paris 2 parts; Water 2 parts.

First roughly powder the cyanide and mix with the plaster of Paris, then add the water; thoroughly mix and quickly pour into suitable bottles; when set, place a layer of white blotting paper on the top, for the purpose of absorbing any exudation from insects caught at sugar on freshly-emerged specimens. The above form will be found to constantly give off vapour of cyanogen until all chemical action has ceased. Usually I only charge my bottles once during the season.

Chloroform I find invaluable for all green coloured insects, more especially the *Hylophila* family, the colour of which cyanide quite destroys, leaving them a rusty brown. Chloroform I also find the best for all *Tineæ*.[1]

Laurel leaves owe their virtue to the same source as the cyanide, viz., cyanogen, and I daresay are very good.

With reference to ammonia, practically I have always shunned it; theoretically I should have thought it would have a most deteriorating effect upon all green coloration, to say nothing about less brilliant colours, but with all due respect to our valuable Editor, "the proof of the pudding, etc."—J. P. MUTCH, 359, Hornsey Road, N.

After the experience of more than a quarter of a century, I am convinced that ammonia is the best agent generally for killing lepidoptera. In my early collecting days I commenced with laurel leaves, but specimens so treated became so stiff as to render setting, after I had learned to be critical in this respect, most difficult. I then turned to the cyanide of potassium bottle, and found this but little improvement; so the cyanide of potassium bottle was discarded. I then tried ammonia (the solid lumps of sesqui-carbonate as recommended by Dr. Knaggs in his invaluable *Lepidopterist's Guide*), and have used it now for more than twenty years. In the case of large species, such as the SPHINGES and some of the BOMBYCES, I usually put these into the bottle just before retiring to bed, and in the morning they are in a beautifully relaxed condition for setting. Small insects—most of the GEOMETRÆ, in fact—I found ready for setting in about six or eight hours, and I do not prefer that these should remain in the bottle longer. I need not say that each insect is first put into a comatose state with chloroform. But it must be remembered that ammonia cannot be used for all species of lepidoptera. It is well known that green[2] insects are irretrievably ruined by it. And my experience is that it is not suitable for many of the RHOPALOCERA. Black and dark-coloured species, such as *Limenitis sibylla*, *Apatura iris*, the *Erebias*, *Satyrs*, and the *Theclas* are not improved by its fumes; they are rendered somewhat rusty by it. The appearance too of *Chrysophanus phlœas* is quite changed by ammonia, the brilliant metallic copper gives place to a dull washed-out brown, and if left in sufficiently long, the copper colour disappears almost altogether. The undersides of the LYCÆNAS acquire in the vapour of ammonia a buff tint; but this passes off after the insects have been aired. It should be borne in mind, however, that the dark-coloured butterflies and *C. phlæas* never regain their colours and beauty. It will be asked, perhaps, what I do in such cases. I first stupify with chloroform, and then stab the underpart of the thorax with a fine steel pen dipped in oxalic acid. Insects so treated can, and must be, set at once. The idea may occur, why not kill all specimens in this way? For one or two reasons. First, perhaps, because there is the suspicion that it is not the most merciful of methods. In the second place specimens so killed cannot be put aside for setting; it must be done at once, or *rigor mortis* will prevent, and, so far as I have found, the stiffening does not pass away. Then, unless very skilfully done, there is danger in the stabbing process, either that the insect should be spoiled by the pen, or the acid should spread over and disfigure the wings. It requires a steady hand and some experience to know just the amount of acid necessary for the purpose. It will be understood then that I adopt this plan *simply because forced to do so* on account of the action of ammonia on these particular insects. With these few exceptions, there is nothing to equal ammonia in my opinion for putting lepidoptera to death.—JOSEPH ANDERSON, Jun., Chichester.

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[1] These can be killed just as well with ammonia.—ED.

[2] *Not all if* carefully used.—ED.

Last year I tried the experiment of killing with ammonia instead of cyanide. I used it first on some *Lycæna corydon*, captured specimens, sent me alive by a friend. It had a startling effect on their colour, changing the pretty silvery-blue to a dirty bluish brown. Nor did this vanish on being removed from the fumes.[1] I had most of them to throw away, and those retained are only worth preserving as specimens of chemical changes of colour. I tried it next on six *Erebia blandina*, the only results of a journey for the species made a day or two too soon. They were males, fine as bred, and of a rich glossy brownish black. These it changed to a dull dirty ochreous brown, which colour they still retain. I tried no more, but as no mention is made by your correspondents of any colour change in their specimens, I venture to submit my painful experience.—JOHN E. ROBSON, Hartlepool.

THE LAUREL JAR.—Your correspondent, the Rev. G. H. Raynor, does not seem to appreciate this very useful mode of killing insects. To coleopterists it is simply invaluable, and a few hints respecting its preparation may perhaps be of service to others. In the first place, procure a wide-mouthed glass pickle jar, with a patent lever stopper, this latter is much to be preferred before cork, rendering the bottle as nearly as possible air-tight. Tin boxes should be avoided, as laurel kept in these soon dries up. It is highly important that the laurel should be picked during dry weather. The best time is the afternoon of a bright sunny day at end of May or beginning of June, as the young shoots are then tender and full of sap, and are best for the purpose. If picked in damp weather, the laurel sooner or later turns mouldy. Lay the gathered shoots on a newspaper and pound well with a hammer, so as to bruise all the stems and leaves.

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[1] I cannot understand this. I have a drawer full of *corydon* to exhibit all the phases of variation possible. The males would compare with freshly-emerged specimens in colour, but all were killed with ammonia.—ED.

Then fill the bottle rather more than three parts full, and close up the mouth. It is now ready for use, and for relaxing purposes is not to be excelled. A jar prepared in this way will last a couple of years, and even then is of use as a store place for insects which do not require immediate carding.

The bottle should not be kept on a ground floor, as it may be damp; nor on a top shelf in a room, as the laurel "sweats" from the heat. Beetles should be placed in small pieces of muslin, and tied with cotton; the parcel can then be lifted out when required for use. I need hardly point out that the mouth of the bottle should be closed as quickly as possible after using, as it is by exposure to the atmosphere that its strength evaporates. The laurel in a small collecting bottle can be renewed as occasion requires, but with care this need not be done very often.—G. A. LEWCOCK, 73, Oxford Road, Islington, N.

RECENT WORK ON THE INSECT-FAUNA OF MIDDLESEX.—How true it is that those things which are nearest to us go most unheeded! For the last three years (1887-1889) I have been tabulating the current records of Middlesex insects, so far as the literature at my command has enabled me to do so, and I have been astonished to find that practically nothing is being done in the county nearest to the metropolis —although, as I know from my own experiences, this is .from no real scarcity of interesting matter for study. I will give under the headings of the orders, a brief summary of the work done, so far as I know of it, and this will speak for itself. I shall be glad to be informed of any omissions from the list. I have included insects reported from London :—

COLEOPTERA.—*Carabus auratus*, as formerly, falls a prey to Mr. Billups, in the Borough Market (*Entom.*, 1879, 158; 1887, 187; 1889, 168). *C. monilis* is reported by Mr. Grant (*Entom.*, 1888, 92) from Harrow. *Zabrus gibbus* is rather doubtfully recorded from Harlington, by Miss Ormerod in her *Rept. Inj. Ins.* for 1888, p. 44. *Lebia crux-minor* occurred at Lea Bridge, as we may infer from a note by Mr. G. V. Hudson, in the exchange column of *Entom.*, October, 1888. *Bythinus validus* is recorded from Hampstead (W. W. Fowler, *Ent. Mo. Mag.*, 1887, 51). For records of five of the larger water-beetles see *Nat. World*, 1887, 116; *Entom.*, 1887, 162; and *Entom.*, 1890, 20. *Leistrophus* species are noted by Mr. Milton in *Entom.*, 1888, 323. *Lœmophlœus pusillus* is found in London (C. G. Hall, *Ent. Mo. Mag.*, 1889, 262). *Blaps mortisaga* turned up in the Borough Market (*Proc. South Lond. Ent. and N. H. Soc.* for 1887, 57). *Anobium paniceum* is recorded from N.E. London (J. A. Clark, *Entom.*, 1889, 140). *Xestobium tessellatum* is from Sunbury (*Entom.*, 1887, 114). *Scolytus destructor* is noticed in the London parks (*St. James' Budget*, June 23, 1888, p. 14). *Onthophagus vacca* is recorded from near Stamford Hill (F. Milton, *Entom.*, 1888, 323). *Callidium violaceum*, from Wormwood Scrubs, is noted on Mr. T. H. Hall's authority, in *Entom.*, 1889. *Cerambyx moschatus*, from the Brent, is recorded in *An. Rept. Ealing Micr. and Nat. Hist. Society*, for 1887-8. *Malachius æneus* is recorded from Sunbury by Mr. Lewcock (*Proc. South Lond. Ent. and N. H. S. for 1887, 68.*) Mr. Lewcock also records four species of *Donacia* from

Sunbury. *Phædon tumidulum* is recorded from Isleworth, in *12th Report Colorado Biological Association* (1889). Canon Fowler has mentioned in his writings several beetles from "London district" or "near London," but whether these occur in Middlesex we are not informed.

NEUROPTERA.—*Siphlurus armatus* is recorded by Mr. A. E. Eaton (*Ent. Mo. Mag.*, 1888, 31). *Neuronia clathrata* in the Tottenham marshes is noted by Mr. McLachlan (*Ent. Mo. Mag.*, 1888, 67 and 173). Mr. McLachlan also notes *Agrypnia picta* from Highgate. *Raphidia londinensis* from near Potter's Bar, is mentioned by Mr. F. Milton (*Entom.*, 1888, 323). *Brachycentrus subnubilus* occurs on the banks of the River Lea (W. C. Boyd, *Ent. Mo. Mag.*, 1889, 308). In *Entom.*, 1889, 189-190, the Rev. Dr. Walker mentions *Libellula, Sialis*, and *Panorpa*. To these I may perhaps add one or two unrecorded captures. I have taken *Cænis halterata* (kindly named for me by Mr. McLachlan) at Hammersmith, by the Thames. Mr. F. G. Fenn sends me word of a *Chrysopa*, apparently *C. tenella*—a rare species—found at Bedford Park, Chiswick. Some published notes on the insects of Bedford Park appear in *Entom.*, 1887, 43-44.

ORTHOPTERA.—Here the records are scanty indeed. Mr. S. T. Klein found *Phasgonura viridissima* at Willesden, and, I believe, recorded it. *Pachytylus migratorius* is quoted by Mr. E. Shaw from Hampstead (*olim*)—and one may mention that in *Gard. Chron.*, 1857, the same species is reported in London. The papers of Mr. Shaw in *Ent. Mo. Mag.*, and of Mr. E. J. Miller in *Entom.*, afford us records of *Stenobothrus elegans*, *Meconema varium*, *Phyllodromia germanica*, *Periplaneta americana*, *Panchlora maderæ*, and *Blabera gigantea*. It may be well to mention that *Stenobothrus lineatus*, recorded in 1886, from Bedford Park, must be regarded as more than doubtful, as the identification of the species was founded on British Museum material, concerning which see Mr. Shaw in *Ent. Mo. Mag.*

HYMENOPTERA.—*Monomorium pharaonis* is indicated as from London by M. A. Bellevoye (*An. de la Soc. Ent. de France*, viii., 1888). *Sirex juvencus* (S. Robinson, *Entom.*, 1888, 282) and *S. gigas* (H. D. Sykes, *Entom.*, 1888, 323; S. Robinson, *Entom.*, 1889, 117) come in for their share of notice. Mr. S. T. Klein (*Journ. of Micr. and Nat Sci.*, 1887) records *Tripoxylon figulus*, *Megachile centuncularis*, *Osmia rufa*, and *Chrysis ignita* from Willesden. *Apis mellifica ligustica*, domesticated, is noticed from Willesden, by Mr. Klein, and from Bedford Park, by Mr. F. G. Fenn (*An. Rept. Bedford Park N. H. and Gard. Soc.* for 1886-7, p. 6). *Bracon brevicornis* is reported a parasite on *Ephestia* in London by Mr. Klein, in *The Miller*, 1887, 446. *Lampronota* (spp.) are reported in *Entom.*, 1888, 323, and 1889, 190.

LEPIDOPTERA.—Here we get a few papers enumerating many, if common species. Dr. Rendall, in *Entom.*, 1887, 199, records London species, as also does Prof. Meldola, *Entom.*, 1887, 235. Mr. S. T. Klein, in *Journ. of Micr. and Nat. Sci.*, 1887, mentions many species from Willesden. Of butterflies, I find mention of fifteen species, including *Vanessa antiopa* (*Entom.*, 1887, 177), *V. polychloros* (*Entom.*, 1887, 199), *Pararge megæra*, Highbury Place, (H. Hodge, *Entom.*, 1887, 266), and *Lycæna corydon*, near Hounslow, (*Entom.*, 1887, 229). The butterfly literature is all in *Entom.*, except *Pieris brassicæ*, Holloway Road (F. W. Smith, *Nat. Gazette*, 1889, 47), and *E. ianira* and *C. pamphilus*, Brent Road (in the Report of the Ealing Society, for 1887-88). Many moth records are in the *Entomologist*, which I need hardly enumerate in full detail. Some of the more notable are *Chærocampa nerii*, Poplar (*Entom.*, 1888, 258, 265), London Bridge (*Entom.*, 1889, 120); *Sphinx convolvuli* (*Entom.*, 1887, 64, 304; 1888, 56); *Deilephila galii* (*Entom.*, 1888, 210, 274); *Chærocampa porcellus*, Hounslow (*Entom.*, 1888, 19); *Arctia villica*, Lea Bridge (G. V. Hudson, in exchange column of *Entom.*, Oct. 1888); *Notodonta dictæoides*, Hampstead (J. Lea, *Entom.*, 1887, 275); *Pterostoma palpina*, Hounslow (*Entom.*, 1888, 19); *Leucania straminea* v. *nigrostriata* (*Entom.*, 1888, 247), and so forth. Anyone interested can find the records by looking over the back numbers of the *Entom.* Otherwise recorded species are not very numerous. *Zeuzera pyrina* is noted in *Ent Mo. Mag.*, 1889, 456. *Dicranura bifida*, Shepherd's Bush (Jäger, *Proc. South Lond. Ent. and N. H. S.* for 1887, 61); the present writer has found larvæ of this species at Acton. *Apamea ophiogramma*, Hammersmith Marshes (J. T. Williams, *Proc. S. L. E. and N. H. S.* for 1887, 64). *Lobophora halterata*, Hounslow, (Rendall, *Proc. S. L. E. and N. H. S.*, 1887, 71). *Scotosia vetulata* and *S. rhamnata* (Jäger *l.c.*). *Acentropus niveus*, Hampstead (*olim*) (Barrett, *Ent. Mo. Mag.*, 1888, 199). *Incurvaria capitella*, Highgate (Elisha, *Proc. S. L. E. and N. H. S.*, 1887, 75). *Ocnera* (sp.), London (R. W. Lloyd, *Ent. Mo. Mag.*, 1888, 237). Quite a big literature has sprung up about the *Ephestia kühniella* in the east of London; here are some of the references:—Miss Ormerod, *Rep. Inj. Ins.* for 1888, 67; S. T. Klein, *The Miller*, 1887, 446; *Ent. Mo. Mag.*, 1887, 163; J. W. Tutt, *Entom.*, 1887, 212; S. T. Klein, *Trans. County of Middlesex Nat. Hist. and Science Society*; R. Adkin, *Field*, 1887, 829; Riley and Howard, *Insect Life*, 1889, 260.

HEMIPTERA.—Very few. *Naucoris cimicoides*, Stamford Hill (F. Milton, *Entom.*, 1888, 323). *Ranatra linearis*, near Tottenham (Milton, *Entom.*, 1890, 20), and two introduced species. *Lecanium longulum* and *Dactylopius theobromæ*, recorded by Mr. J. W. Douglas in *Ent. Mo. Mag.*, 1887, 97-98; 1889, 317. To these I may add two new records, *Sehirus bicolor*, found by myself by the canal near Southall, and *Tropicoris rufipes*, found at Brentford by Mrs. Skilton.

DIPTERA.—Three species are recorded by Rev. F. A. Walker in *Entom.*, 1889, 189. Two are recorded by Mr. F. Milton in *Entom.*, 1888, 323. Mr. Brunetti records fourteen species in *Entom.*, 1889, 132, 133, 86, and *Ent. Mo. Mag.*, 1889, 280, 281. I have some unpublished records, including *Bibio hortulanus*, Chiswick High Road, and the following from Bedford Park, kindly named for me by Mr. Verrall;—*Pteropœcila lamed*, Schrk. (= *Ortalis pulchella*), *Nemopoda* (*cylindrica*, Fab. ?), *Rhinophora* (*umbratica*, Fab.?).—T. D. A. COCKERELL, 3, Fairfax Road, Bedford Park, London, W.

LOCAL NATURAL HISTORY COLLECTIONS.—My attention has been called to a note in the *Entomologist's Record* for May, in which you disparage the nomenclature and arrangement of the Diurni in the Folkestone Museum. I shall feel obliged if you will make known the fact that, although I have recently accepted the curatorship of this department, I have no control over the butterflies, my duties are confined to the moths. The Diurni had previously been arranged by another gentleman, and as I am quite unable to coincide with his views on the subject, I prefer to leave that group entirely in his hands. The moths are exclusively under my control, and I am glad to know that my arrangement of this branch of the collection, though yet in its infancy, has met with the approval of many practical entomologists.—REGINALD E. SALWEY, Peace-Wold, Folkestone.

[No one who knows Mr. Salwey would for a moment suppose he was responsible for the naming, etc., of the Diurni in this collection. It is a great pity, though, that Mr. Salwey cannot bring some pressure to bear on the authorities so that this part of the collection shall be, at least, named correctly and arranged with common sense. Since writing the above, Mr. Salwey informs me that the arrangement of the moths have been altered without his sanction and he has now entirely severed his connection with the Museum.—ED.]

PRACTICAL HINTS.

BY W. H. TUGWELL, M.P.S., ETC.

(*a*) When sugar fails, as it often does in hot and dry weather, instead of going home empty-handed and grumbling, search, by means of a light, flower heads, grass stems, rushes, or honey-dewed leaves, when frequently you will realize a rich harvest. My best captures have been so obtained.

(*b*) At end of August and early September split down from top to bottom the stems of thistles and burdock, when pupæ of *Gortyna flavago* will tumble out. *June*,[1] as mentioned in No. 1 of the *Record*, is much too early!

(*c*) Middle to end of July. At night not earlier than 10.30 p.m. to early dawn, search with a light, in grassy places on the S.E. coast, especially if dwarf bushes of sea-buckthorn occur, and you will probably find *Nola centonalis* sitting quietly on the grass or leaves of the buckthorn. They do not fly freely, and require a close search, or are readily overlooked.

(*d*) *Eulepia cribrum* may be obtained all through July on the lichen-covered heather, two or three miles out of Ringwood, on the Bournemouth road. Gently sweep or brush your net over the heather as you walk along, and *cribrum* will start up and fly rapidly a short distance. Mark it down and stalk it. They may be disturbed all through the day, but early evening is the best time.

(*e*) *Acosmetia caliginosa* flies in the grassy rides of Stubby Copse, Brockenhurst, through July. It is best obtained by gently sweeping a net over the herbage as you walk along by day, and it comes freely to light at night. *Hyria auroraria* occurs at the same place, but flies in the sunshine.

(*f*) On the S.E. coast, or wherever the Nottingham catchfly (*Silene nutans*) grows, the larva of *Dianthœcia albimacula* may be found in the evening by searching the plant and then gently beating it into a net Place larvæ so obtained in a calico bag or band-box with a supply of seed-heads, and they feed up on the unripe seed. It is better to collect the pupæ from these receptacles, as too often you have other lovers of pupæ confined with them, who will gladly make a meal off them.

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[1] Certainly, this was a clerical error, and should have been corrected.—ED.

(*g*) Always carry a few small calico bags with you to collect the seed-heads of different plants for larvæ. *Silene* for *Dianthœciæ;* toad-flax (*Linaria vulgaris*) for larvæ of *Eupithecia linariata ;* flowers of foxglove (*Digitalis purpurea*) for *E. pulchellata* (especially if the flowers are partly closed up by being spun together); seed-heads of nettle-leaved bell-flower for *E. campanulata;* seeding flower-heads of *Scabiosa arvensis* and *succisa* for larvæ of *Eupœcilia flaviciliana ;* cowslip seed-heads for *E. ciliella ;* and spun together tops of sallow-shoots for *Peronea hastiana.*

(*h*) Search low plants on marsh ditches during August for larvæ of *Arctia urticæ*, fond of sunning themselves; willow herb and water bed-straw for larvæ of *Chærocampa elpenor ;* and white or yellow bedstraw on dry banks, sand hills, etc., for larvæ of *C. porcellus* and *Macroglossa stellatarum ;* and if in woods you notice the leaves of honeysuckle eaten on the low trailing branches, turn them over for larvæ of *M. fuciformis.*

SOCIETIES.

City of London Entomological and Natural History Society.—*June* 19*th*, 1890, Mr. J. A. Clark, F.E.S., President, in the chair. Mr. Battley exhibited a growing plant of the Sundew, from the New Forest; also *Macroglossa fuciformis* and *Bombyx rubi*, from the same locality; Messrs. Lusby and Harper, a fine selection of very variable specimens of *Abraxas grossulariata*, the dark colour being predominant in the whole; Mr. Sampson, a heavily mottled imago of *Venilia maculata.* Messrs. Clark and Milton exhibited boxes of Coleoptera and Neuroptera—Mr. Milton giving a highly interesting account of the life-history of the latter order.

July 3*rd*, 1890, Mr. G. A. Lewcock in the chair. Mr. Lusby exhibited fine varieties of *Syrichthus alveolus*, one specimen having the white spots on the fore wing formed into a band, the hind wings black with a single white blotch in the centre; several other varieties were also noticeable in the series; Mr. Raine, male specimens of *Liparis dispar*, with the dark markings very strongly defined and nearly black; also preserved larvæ of *Endromis versicolor*, etc.; Mr. Battley, a series of *Ephyra trilinearia*, from Epping Forest; one specimen with a white spot on the hind wing very clearly marked and outlined with a darker tint than the ground colour of the wing; Mr. Gurney, a very large specimen of *Phorodesma smaragdaria*, bred that day from larvæ found on the Essex marshes last autumn; Mr. Manley, two specimens of *Sphinx ligustri*, the centre band on the body being quite black, the wings suffused with the same tint; Mr. Gates, full-fed larvæ of *Cerura vinula ;* Mr. Bellamy, *Triphæna pronuba*, with the band on hind wings interrupted, and more resembling that of *T. orbona.* Mr. Simes also exhibited a case of life-histories of various species of Lepidoptera.

Coleoptera :—Mr. Cripps' box contained *Melanotus rufipes*, *Polyopsia* *præusta*, and a series of *Athous vittatus*, all from Brockenhurst; Mr. Heasler, *Donaciæ* from Deal, etc., including *D. menyanthidis*, *D. nigra*, *D. thalassina*, *D. typhæ*, *D. lemnæ*, etc. Mr. Lewcock made observations respecting two specimens of *Silpha 4-punctata*, taken recently by Mr. Raine, at Wood Street, Walthamstow, and gave some descriptions of the habits of the beetle.—G. A. Lewcock and E. Hanes, *Hon Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —*June 12th*, 1890. Nothing of much interest occurred at the meeting, although a fair number of exhibits were made. Messrs. W. West and Nussey exhibited each a var. of *Smerinthus tiliæ*, with the central band of fore wings reduced to a very small spot; Mr. Tugwell exhibited bred *Nemoria viridata* and two extreme forms of *Biston hirtaria*, the male being especially brown, the female especially dark; Mr. Adkin exhibited *Herbula cespitalis*, taken by Mrs. Hutchinson at the Land's End, with the yellow markings well developed. [The same form occurs at Deal.—ED.] Also larvæ of *Larentia cæsiata*, from the Grampians, and males and cases of *Psyche villosella*, taken at Bournemouth; Mr. Wellman exhibited *Eupithecia rectangulata* var. *nigrosericeata*, and *E. venosata*, from the Isle of Man; also *Nemeobius lucina* and *Acronycta strigosa;* Mr. Warne, *Bombyx rubi*, *Nemeobius lucina*, and *Macroglossa fuciformis*. The best exhibit of the evening was a fine variety of *Ephyra punctaria*, with a very dark central band across all four wings, the specimen being exhibited by Mr. Robson. Mr. Adkin exhibited *Eumenes coarctata* and its nest; and Mr. Billups, Hymenoptera, from Borneo and Kentucky.

June 26th, 1890. Quite an interesting meeting took place, the first matter of interest being the agreeable reception of Mr. T. D. A. Cockerell, on his return after a long sojourn in Colorado. The exhibits, too, had more than ordinary interest. The exhibits of the evening were, perhaps, a long series of *Sesia sphegiformis*, taken in Sussex, by Mr. Robinson, principally by "assembling;" and some very fine TORTRICES, taken in Kent, by Mr. Fenn, and comprising long and variable series of *Tortrix branderiana*, *Phoxopteryx upupana*, *P. obtusana*, and many others, including a fine var. *nubilata* of *Penthina cynosbana*, and four specimens of the *Ephestia*, bred from rice (*Record*, p. 33), the species of which is very doubtful. Other exhibits were Micro-lepidoptera, collected in Normandy, by Mr. South, almost all being common British species; several species of Coleoptera and Orthoptera, from Normandy, by Mr. Billups; a very pale *gracilis*-like form of *Tæniocampa stabilis*, by Mr. Turner; 2 specimens of *Pycnogonum littorale*, by Mr. H. Moore; 29 species of Diptera, 23 of Hymenoptera, 5 of Coleoptera, 2 of Hemiptera, 1 of Neuroptera, and 1 of Homoptera, taken at the Society's outing on the 19th, at Mickleham, by Mr. Billups; Mr. Hawes exhibited larvæ of *Thecla rubi*, with notes on the early history of the species, the eggs being laid on twigs, leaves, etc., of broóm; Mr. Mansbridge, a good var. of *Cænonympha pamphilus*, var. *lyllus*, taken last August; Mr. Cockerell, a larvæ of *Tæniocampa instabilis* feeding on mulberry, the exhibit being made from an economic point of view, as scarcely any native species are known to feed on the mulberry; Mr. Tugwell bringing the exhibits to a close with a number of northern species of plants. A discussion relative to the effect of temperature in producing early emergences then took place, Mr. Carrington suggesting that, if a minimum of temperature were taken for each species a certain sum total of heat above this minimum would produce emergence. Mr. Fenn wished to know how it was, if this quantity of heat were fixed, that of many pupæ kept under precisely similar conditions of temperature, some would emerge one year and others would not do so for another year, the latter, of course, absorbing much more heat than the former. Mr. Tutt suggested that it seemed that the influence of temperature in producing rapid development appeared to depend on one fundamental principle:—The insect in the pupa-case undergoes a slow process of development. If a certain point in this development be reached, then increased temperature at once influences the pupa, and rapid emergence is the result; but if it be not reached, then increased temperature is inoperative in this direction until such point be reached. Mr. Adkin brought the discussion to a close by remarking, that of two lots of *Eupithecia vulgata* pupæ, one lot kept for some months during the winter in the house, and the other out of doors, the latter, although they must have absorbed much less heat, emerged a day or two before theothers, and that the indoor influence had apparently been inoperative.

July 10th. A few very interesting exhibits took place. Mr. Jäger exhibited a fine series of *Dianthœcia capsophila* from the Isle of Man. Specimens of the same species (more resembling *carpophaga*) from South Wales, a very dark *Dianthœcia cœsia* also from the I. of Man; Mr. Wellman, a very fine box of *Dianthœciæ*—comprising *cucubali*, *carpophaga*, *capsophila*, and *conspersa* from different Scotch, Irish and English localities; also a very long series of *Eupithecia rectangulata* var. *nigrosericeata* from Streatham; Mr. Croker a long series of *Nola cucullatella* with black vars. from the London District; Mr. Howard Vaughan, an interesting box of Scotch specimens including *Melitæa artemis*, *Cœnonympha davus* (undersides), several *Eudoreæ* (*Scopariæ*), 2 strange looking *Procris*, apparently *statices* but with antennæ somewhat resembling those of *globulariæ*, Mr. Briggs, a box of *Procridæ* to compare with Mr. Howard Vaughan's specimens; Mr. Gerrard, *Psyche vilosella* (case) and *Eulepia cribrum*; Mr. Adkin, variable *Coremia propugnata* and *Eupithecia nanata*, the latter varying considerably within certain limits. A discussion *re* vars. *callunaria* and *curzoni* took place and Messrs. C. G. Barrett and Tutt gave decided opinions as to *curzoni* being an extreme var. of *E. satyrata*; Mr. Joy specimens of *Meliana flammea*, *N. cilialis*, and *M. arundinis* recently captured in Wicken Fen; Mr. Jenner Weir, specimens of *Volucella bombylans* showing mimicry in the direction of the *Bombi*, on which it is parasitic; and Mr. Billups specimens of *Trichiosoma betuleti* and its parasite bred from cocoons taken at Mitcham. Other minor exhibits took place. Very little discussion took place on the exhibits.—Ed.

[The labour of writing out an extra Report of this Society for the *Record* is too great for the Secretary. The Council agreed that we "should have copies of the Reports when they were sent to other Magazines." This means that some would be 6 or 8 weeks late in publication. The Reports will therefore be printed or left out according as to whether it is convenient or not for me to attend and report the meeting. I make this statement in order to show our subscribers who are members of the South London Society, that I have done my level best to publish the Reports if I can get them up to date.—Ed.]

The Entomologist's Record
AND
JOURNAL OF VARIATION.

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page* 90.)

"*NATURA non facit saltum*" is a well-known saying among naturalists. Changes are not brought about in nature suddenly, and in no natural study is the saying more true than in our own interesting pursuit. There is no doubt that the tendency to melanism is brought about gradually, when once commenced, by "natural selection," and increased by "hereditary influence." But I was unprepared for the startling (to me) suddenness with which many species, during the wet season of 1888 assumed a darker colour. In none of the lepidoptera that I met with, was this perhaps more strikingly illustrated, than in *Lithosia pygmæola*, *Xylophasia monoglypha* (*polyodon*), *Agrotis corticea*, and *Agrotis tritici*, although others showed this influence. *L. pygmæola*, which is in favourable weather so exceedingly abundant on the sandhills of Deal, is, as is well known, usually of a pale yellow colour in the males, and of a darker shade or grey in the females; occasionally, however, a darker specimen than usual occurs, showing that there is a tendency in the species to vary in this direction; but in the summer of 1888 a very large proportion of the specimens were exceedingly dark, and I have in my cabinet some strikingly dark specimens, although the species was scarcer than in any year since I have collected at Deal. *Xylophasia monoglypha*, which is usually of the pale variegated form, with an occasional var. *obscura*, were that year in greater abundance than usual, but almost all were var. *obscura*, some approaching var. *brunnea*, and one striking specimen of var. *infuscata*. In another very wet season (1872), a black *polyodon* was recorded from Sheerness. Again in 1888, at Deal, it was difficult to find anything but dark *Agr. corticea*. In some seasons, specimens as pale as ordinary ♂ *A. cinerea* are not rare, with a fair number of dark and black vars. In 1888 almost all were dark and black, scarcely a pale var. was to be obtained. Beautiful whitish vars. of *tritici* are not rare in ordinary seasons; that year they were comparatively rare, and the series I brought home was darker than any I have previously captured. There is no doubt that a succession of seasons like 1888 would intensify these varieties, to the almost utter exclusion of the paler forms. I think this illustrates the fact, that meteorological influence has played a great part in the sudden darkening of certain species, and that, given a number of seasons suitable to this particular development, the dark would altogether outnumber the pale forms.

I am not alone in noticing the influence which a wet season has on the sudden development of variation in certain species. In the *Entomologist*, vol. xxii., pp. 38, 39, Mr. W. W. Smith, of Ashburton, New Zealand, writing of the variation of *Argyrophinga antipodum*, says:—"There can be no question that many species of lepidoptera are greatly influenced in all stages by changes of temperature or by the seasons; and from notes on the variation of this butterfly in relation to the seasons, made during many years, I am in a position to show that the species exhibits greater variation in some years than others." Mr. Smith then goes on to show that in the dry seasons, 1881-83, there was little variation. He then writes:— "Then followed the wettest winter, and equally wet and coldest summer on record in New Zealand; every day of bright sunshine produced the emergence of some specimens of *A. antipodum*, and fresh individuals continued to appear until much later in the season than usual. In the same year (the early months of 1884), I collected the most variable forms of both sexes I had hitherto obtained." The years 1885, 1886, and 1887 were drier, and produced less variable specimens, but "last summer (1888), which was preceded by a very wet winter, there was again a greater number of more richly marked and variable forms. From the foregoing notes it will be seen that the variation of the species is most predominant in seasons succeeding wet winters. The same remark applies to *Chrysophanus boldenarum*. How the seasons operate in producing this effect requires careful investigation," etc. Mr. Smith then adds:—"An abundance, scarcity, or change of food, and its environment during the larval stage, are known to produce great variations among certain species; with *A. antipodum*, the finest marked and best developed forms are evolved in humid seasons, and such succeeding wet winters. . . . . I am not in a position to say that the tendency to darkening in the colours of the species is, in humid seasons, a case of atavism; but I incline to such an opinion, as the preceding geological period in New Zealand was immensely more humid[1] than the present, a fact which I think favours such a view."

Here, then, is a positive proof of a primary exciting cause, and, if nature develops dark varieties in wet seasons more than in others, and, in wet seasons, species normally invariable, are more or less variable—*vide Entom.*, vol. xxii., pp. 37–39, as well as my own remarks on the sudden development of a melanic tendency in wet seasons—I think it a fair deduction to assume that the variation is primarily the result of meteorological influence, and that humidity is essentially the exciting cause.

There is no doubt that "natural selection" is almost entirely the direct cause of the variation in colour (both melanochroic and leucochroic) of species which rest upon the bare ground, and that the insects which assimilate most completely to the geological strata on which they rest, are those which are preserved in the struggle for existence, and which finally establish a particular form in the district. NOCTUÆ and many GEOMETRÆ rest on trees, fences, or the ground. Many rocks, and almost all trees and exposed fences are darkened by rain,[2] hence the assimilation becomes more complete in naturally wet and humid districts. But to take a special case where the direct influence of humidity can, compared with "natural selection" have very little to do with the variation in colour. *Gnophos obscurata*, as is well-known, is one of the most striking examples. I devote a drawer to the series of this species in my collection, and what do I find? I find that among the specimens captured on the chalk a large percentage of pale forms occur, assimilating most perfectly to the chalk on which they rest; but even here, in the more exposed situations, there is general variation within narrow limits in both sexes, and the females are generally darker than the males. I have always supposed this latter phase to arise from the fact that the females appear to rest more among the herbage than do the males. On very impure limestones grey forms occur, assimilating most perfectly with the limestone; while on peat, dark peaty-black coloured specimens are found. On slate formations intensely dark slate-coloured or black specimens are the ordinary form, while I have very red specimens from the red sandstone formation. Here is a complete response to environment, and I leave my readers to infer how special races of this particular species have been brought about, and why, on rocks, naturally dark or artificially darkened by rain, black forms are most generally found. The same line of variation is traceable in *Boarmia repandata* in districts where it settles and rests on the ground, and not on the trunks of trees as is usual with us in the woods of Kent and other southern counties. I have specimens varying in colour exactly in the same way as those of *G. obscurata* just mentioned, viz., from whitish to black. In these species both the pale and dark races are those which have been developed by "natural selection" in the particular localities in which they are found. Although humidity or wetness, by darkening the surfaces on which the insects rest, would intensify the colour, yet the particular geological formation is here the prevailing factor, or why should we get white forms on the purer cretaceous strata, grey on the impure limestones, red on the red sandstones, black on the slates and schists, and brownish-black on peat? In short, why is there such a complete response to environment? Speaking of these leucochroic and melanochroic forms, Dr. Buchanan White, *Ent. Mo. Mag.*, vol. xiii., p. 149, makes the following remarks, which my own observations have since materially borne out. He writes:—"That there is exciting cause for both forms I am persuaded, because we find that species, which are sufficiently common for us to observe year after year in abundance, are found to be much more subject to variation in some years than others; and if (presumably) the meteorological differences of one year from another, cause, in a single locality, a varying amount of variation in species, we may reasonably conclude that the meteorological differences between one *locality* and another, continued year after year, will tend to *variation in different* directions in the individuals of a species common to both. Then, if in one locality, where the struggle for existence is greater, a peculiar variation is found to carry advantages with it, "natural selection" steps in and does the work, and, if the advantage is very great, may eventually result in that particular variety supplanting all others. If the advantages were not so great, the particular variety would not be so particularly favoured; and if there were no special advantage (but still no disadvantage), then the variety would only be on an equal footing with the other forms, and individuals of that character would vary in number from year to year, according as the meteorological conditions (presumably the exciting cause) varied, with a certain percentage for heredity." This is in general terms what my own observations have suggested (*Entom. Record*, vol. i., pp. 121, 122), and is borne out exactly in Mr. Smith's paper, "On the variation of *Argyrophinga antipodum*" (*Entom.* xxii., pp. 38, 39) previously referred to, where he shows that this species varies in proportion to the general humidity of the season. No better example of the incidental reasoning, in the extract quoted above, could be given than the Bryophiliidæ—*muralis* and *perla*. The most elementary student of practical lepidopterology will be able to apply the doctor's reasoning to these species, and I will not weary my readers with further explanations of such simple phenomena. Dr. Chapman also suggests:—"There is no doubt that the geology of a district would have some importance —first, as to the colour of the rocks and soil, and secondly as to the colour of the lichens that were most abundant" (*in litt.*).

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[1] It is more than probable that this was so in Britain, as the country was, in comparatively recent times, much more covered with forests and woods than at present, and this alone would make the country more humid.—J.W.T.

[2] Dr. Chapman writes:—"In your paper (*Ent. Record*, p. 56) you criticise the idea of rain *permanently* darkening rocks, trees, etc., by pointing out that they dry in the intervals, but that is precisely what they do not do. Such objects are often wet, especially in some localities, for weeks together, even in the summer; of course they do dry sometimes, but generally they retain one lot of moisture, until they get *another during the greater part of the* summer" (*in litt.*)—J.W.T.

(*To be continued.*)

SCIENTIFIC NOTES.

Humidity the cause of Melanochroism in New Zealand.—In the first number of this Magazine (April 15th) Mr. J. W. Tutt commenced a series of papers on "Melanism and Melanochroism in British Lepidoptera;" he then referred to a paper having been read by Mr. Cockerell before the South London Entomological and Natural History Society, as setting forth the cause of melanism to be due to excess of moisture. Mr. Tutt adds: "It struck me at once that a great deal of the melanism and melanochroism of our Islands could be better explained by this theory, in combination with "natural selection," than by any other that had been presented to us," etc. "Since I have devoted my attention to the matter, the information I have been able to gather helps to confirm Mr. Cockerell's view." As this is the first intimation I have had of Mr. Cockerell's paper referred to, I would point out that after many years' observations on the subject in New Zealand, I have also arrived at the same conclusions. In a paper on "The variation of *Argyrophinga antipodum*" (*Entomologist* xxii. 37). I gave the results of colour variation in this species, and in *Chrysophanus boldenarum* for a number of years. At the same time I stated that Melanochroism, or a general darkening of the species, occurred in humid seasons, or such succeeding very wet winters. My remarks on "natural selection," in its bearings on the question of Melanism and Melanochroism are also in support of Mr. Cockerell"s views. It will thus be seen that the same cause produces the same effects on some species in the same latitudes of north and south. Of course, New Zealand is strictly an insular area.—W. W. SMITH, Ashburton, New Zealand. *June 6th*, 1890.

MOISTURE THEORY OF MELANISM.—A striking confirmation of the moisture theory of Melanism came to my notice some few years back. I was then residing at Clapton, and occasionally worked the Hackney Marshes. One evening at dusk I netted about three dozen TORTRICES which, when I got home, I found were *Xanthosetia zoegana*. Quite one half were the form known as *ferrugana*, Haw., which has the whole of the superior wings suffused with a ferruginous tint, instead of bright yellow, as in the type, and of the remainder, several were intermediate between the variety and typical specimens.

Now the spot where I took these was one reeking with moisture, and which during a large portion of the winter months, was covered by floods.

The species occurs occasionally throughout the Lea Marshes; but the specimens I have always found typical except in this particular spot.—W. G. SHELDON. *July 21st*, 1890.

ANEURISM IN LIPARIS SALICIS.—I have noticed similar saccular distension to that described by Dr. F. J. Buckell and others, in *Liparis salicis*.—JOSEPH ANDERSON, JUN., Chichester.

DELAYED EMERGENCE OF LEPIDOPTERA.—The delay in emergence which makes certain individuals of many species remain two or more winters in the pupal state must have several elements in its causation. Some species appear to do so normally—perhaps *Petasia nubeculosa* is the best example of this. I have now pupæ apparently quite healthy going for their fourth winter, and have also *Cuspidia megacephala* going for a third and fourth. There must always be a good deal in individual constitution, for of pupæ identically treated, some go over and some come out. I desire, however, more especially to call attention to what is a very usual cause, and that is not a defect of temperature but an excess. It is as though the pupa felt that its proper season for emergence had arrived or past, before it had made a move, and it must therefore wait till next season. This view appeared to be especially demonstrated when, two years ago, I had some pupæ of several species that I thought I would get out of the way by forcing them, and began to do so early in the winter. Not one of these pupæ would be forced, they resisted the high temperature in the winter, throughout the spring, when their proper season for emergence arrived, and went over the next summer and winter. These pupæ included some *Dianthæciæ*, which are rather prone to taking a second winter, some Geometers, and some

Cucullia verbasci, which I think does not often take a second winter. I think it is probable that had the forcing been commenced gently later in the winter most, if not all, would have yielded to it and come out as desired.—T. A. CHAPMAN, Firbank, Hereford

[I think so too. From my point of view forcing is useless, unless the pupæ have sufficiently matured when the forcing is applied. --ED.]

CURRENT NOTES.

A South European Hemipteron *Amblytylus brevicollis*, Fieb., has been captured at Woking, and described by Mr. E. Saunders, F.L.S., in the *Ent. Mo. Mag.*

The Doubleday Collection at the Bethnal Green Museum has been thoroughly overhauled and the drawers repapered.

Glypta cicatricosa, R., and *G. flavipes* Desv. (the latter bred by Mr. E. A. Atmore, F.E.S., from *Antithesia capræana*) have been added to the list of British Ichneumonidæ by Mr. J. B. Bridgman, F.L.S.; whilst an Ichneumon new to science *G. rubricunda* (bred by Mr. Elisha, F.E.S., from *Argyrolepia maritimana*) is described in the *Ent. Mo. Mag.*

A *Nepticula* new to science (*N. torminalis*) mining in leaves of *Pyrus torminalis* has been described in the *Ent. Mo. Mag.* by Dr. Wood. It is closely allied to *regiella*, but besides the different foodplant, *torminalis* is a single-brooded species, the mines occurring in July.

It has been long known that *Eupithecia dodoneata* frequented hawthorn, Mr. C. G. Barrett, F.E.S., has fed up the hawthorn frequenting species on oak.

Mr. C. Fenn, F.E.S., has bred *Tortrix diversana* (*transitana*) from larvæ feeding in rolled-up leaves of birch. Mr. Fenn suggests that there are probably two species in our collections under this name.

Plusia moneta is said to have been taken at light by Mr. Christy.

Hesperia lineola was taken in some numbers by the members of the South London Society when on their outing at Leigh in Essex.

VARIATION.

VARIETIES OF ARCTIA CAIA AND EUCHELIA JACOBÆÆ.—I have lately bred a very pretty variety of *Arctia caia*, from a larva received from Walthamstow on the 17th May last. The insect does not differ from the ordinary form in the disposition of the markings, but in the colour of the usually white portion of the forewings, which, instead of being of the ordinary creamy white colour, is suffused all over with a pale, but beautiful salmon-pink tint. The insect emerged on the 25th of June last, and is a female; the larva fed chiefly on dock, but I gave it lettuce for a day or two. I have also bred a specimen of *Euchelia jacobææ* which differs from the type in having a minute, but quite distinct, red spot on the forewings at the junction of the two principal veins, which I cannot find in any other specimen in my possession. The larva of this specimen was taken at Winchester on the 30th of July, 1889, feeding on groundsel, and the imago emerged on the 13th of June last.—HENRY A. HILL, 132 Haverstock Hill, London, N.W. *July 5th*, 1890.

VARIETY OF ARCTIA CAIA.—I bred to-day (July 2nd) a variety of *A. caia*, which is unfortunately malformed and utterly unfit for the cabinet. The primaries are of a rich uniform brown without a trace of white; secondaries dark brown around the margins, and still darker in the median area of the wings, the scarlet of the ordinary *caia* is entirely wanting. The larva was not obtained until after hybernation and was then fed on dock.—J. COLLINS, Warrington. *July*, 1890.

APAMEA GEMINA var. REMISSA.—I have captured two specimens of this variety here at bramble flowers. In 1888 three specimens of this variety were taken at sugar by local collectors, but I heard of no captures last year.—J. COLLINS, Warrington. *July*, 1890.

XYLOPHASIA MONOGLYPHA var. INFUSCATA.—I captured a very dark specimen of this variety—almost as black as var. *nigra*—on the Deal sandhills, at sugar, on the 12th inst.—J. W. TUTT. *July*, 1890.

VARIETY OF HIPPARCHIA JANIRA.—I once captured a specimen of this species, with two white spots in the large black one near the tip of the wing, instead of one as is usually the case. The fulvous colour of the patch, in which these spots were situated, was also spread more than is usual in *janira*, indeed it covered a large portion of the wing, thus resembling *H. tithonus*. The hind wings were dark brown with a lighter transverse band. The underside of both fore and hind wings was the normal colouring of *janira*. I was inclined to think it was a hybrid between *janira* and *tithonus*, but probably it was only a variety of the former.—ALBERT H. WATERS, Willoughby House, Mill Road, Cambridge. *July*, 1890.

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON (LEPIDOPTERA).—*Cannock Chase.*—In April *Brephos parthenias* occurred abundantly in Cannock Chase, but was rather difficult to capture owing to its preference for the tops of tall birch trees. *Thecla rubi* was very abundant in the same locality early in May, but may be taken more readily towards evening when resting on the heather. *Cidaria populata* also occurs freely on the Chase in July and August, flying among bracken.—E. P. WRIGHT, Stone, Staffs. *June 15th*, 1890.

York.—Larvæ of many species are very plentiful here this year. I managed to get about a hundred *Tæniocampa populeti* and a fair number of *Tethea subtusa*. Many of the oaks and sallows about here are divested of their leaves by *Hybernia defoliaria.*—S. WALKER, York. *June 13th*, 1890.

Warrington.—At the end of May I collected upwards of fifty larvæ of *Agrotis agathina* by sweeping heather at nightfall, but quite one-half were "ichneumoned." Early in June I went for a second supply, this time only bringing home those that were nearly full-grown. I find the large ones less likely to be "stung," as the parasite appears to leave the host when the latter is about two-thirds grown. Numbers have died off, although I have taken the greatest care with them. I am handicapped in getting fresh food, the nearest heather is quite four miles from Warrington —J. COLLINS. *June 20th,* 1890.

Perth.—I took about twenty larvæ of *Noctua sobrina* by sweeping, about four miles from Perth. Many I am afraid are stung. These took three nights to obtain.—J. WYLIE, Bridgend, Perth. *June 17th,* 1890.

Worksop.—I never remember seeing *Eupithecia lariciata* commoner than on June 7th, in a larch plantation near Worksop. They were out in hundreds, but rather worn. I may mention that *Asphalia fluctuosa* has been very scarce, but Mr. Batty has obtained ova from a captured female.- A. E. HALL, Sheffield. *June 27th,* 1890.

Horrabridge.—Although the weather has been so wet, I have done better in collecting than last year. Campions at dusk have been productive. Hovering over these I took several *Chærocampa porcellus,* besides *Plusia iota, Euplexia lucipara, Habrostola urticæ, Arctia fuliginosa, Apamea rurea, Dianthæcia cucubali, D. carpophaga, Miana strigilis, Agrotis porphyrea, Noctua plecta, Axylia putris,* and *Agrotis segetum.* Among the Geometers, *Emmelesia affinitata, alchemillata, albulata, decolorata,* and *Melanippe rivata.* For the last two years I have never seen *P. iota,* this year it appears moderately common, while *P. gamma* is scarcer than usual.—J. N. STILL. *July 14th,* 1890.

Deal.—The sandhills have been practically ruined entomologically. On that part nearest the town a holiday camp for boys has been formed; the *ochrata* locality has been converted into a golf ground, and it has been levelled almost like a lawn; while the central part of the sandhills is overrun with hundreds of cattle. I never saw the sandhills so perfectly desolate entomologically as they were last Saturday and Sunday when I was there with my friend Mr. Page. We got practically nothing, even the *Gelechias* were almost absent. Among the few things we captured were two *Acidalia ochrata* (all we saw), two *Nyctegretes achatinella, Gelechia desertella, distinctella, marmorea, Chrosis tesserana, Sphaleroptera ictericana, Eubolia lineolata,* and one *Cœnobia rufa.* At sugar, *Agrotis corticea, Xylophasia sublustris, X. lithoxylea, X. polyodon, Mamestra albicolon, Leucania comma, L. impura, Caradrina blanda, C. alsines, Miana strigilis, M. fasciuncula,* with a large number of *Triphæna pronuba,* and *Agrotis exclamationis* put in an appearance. On a piece of rough ground near Deal Castle, *Homœosoma sinuella* was in abundance and in good condition, whilst a hawthorn hedge produced a fine lot of *Sciaphila nubilana,* for the females of which I was very thankful. Larvæ, pupæ, and imagines of *Liparis salicis* were found, but this species is comparatively rare now; whilst from the same poplars small larvæ of *Dicranura vinula* and imagines of *Spilonota neglectana* were obtained. I would again note how excessively abundant is *Hyponomeuta padellus,* many of the hawthorn hedges in the district being quite defoliated. The *padellus* seem to be accompanied by large numbers of *Nola cucullatella* and *Argyresthia nitidella.*

Mr. Page, who stayed two or three days longer, turned up in addition odd specimens of *Acidalia emutaria* and *Lithosia pygmæola,* with three specimens of *Melia anella.*—J. W. TUTT. *July 17th,* 1890.

Portland.—I have been working industriously, but without much success, until the last week. *Eupithecia coronata* has been plentiful all this month, and *Coremia ferrugata* since the 10th inst. *Melanippe* *galiata*, *M. subtristata*, *Melanthia ocellata*, *Lycæna alsus*, *L. alexis*, and *Nisionades tages* are just appearing. I started sugaring early this season (on the 14th) as an experiment, and find *Apamea basilinea* and *Phlogophora meticulosa* plentiful. I have also taken a few *Agrotis puta*, with *Neuronia saponariæ*, *Hadena dentina*, and *H. thalassina*. I would add that I have been surprised to see *Tæniocampa gothica* (about a dozen), *T. rubricosa*, and *T. gracilis* at sugar. If these representatives of the sallow frequenters will come to sugar, I suppose the remainder[1] will do so? and draw the inference that in seasons like the present, when the sallows are early over, it might pay to sugar in those localities where good species occur.—E. W. BROWN, Portland. *May 24th*, 1890.

Richmond.—I spent May 27th at Richmond (Yorks), but the weather was too dull, cold, and windy for insects to fly. I found two specimens of *Hadena glauca*, and one *Cidaria silaceata*, while a few *Pyraustæ* were on the wing when the sun shone for a few minutes.—W. NEWMAN, Darlington. *May*, 1890.

London District.—*Biston hirtaria* has been very plentiful this year. An excursion on May 1st in search of *Lycæna argiolus* only yielded one —evidently the species was not then fully out. *Hemerophila abruptaria* was first taken on May 5th. A visit, on May 15th, to the more northern part of Epping Forest produced 6 *Drepana cultraria* beaten from beech, and 1 *Boarmia consonaria* from a hornbeam trunk—the first time I have taken this species in the London district. On May 22nd *Scotosia certata* was in good condition on palings at Highgate. On May 25th, at Riddlesdown, I took *Cuspidia aceris* at rest (an early date for the species), *Lycæna astrarche* seemed to be not fully out, while *Eupithecia coronata* was worn.—F. J. BUCKELL. *June 2nd*, 1890.

Liverpool.—The weather here has been so bad that I have been unable to do much. Yesterday at Crosby the total result was 1 *M. galiata* and 2 larvæ of *Bombyx trifolii*. The latter used to be extremely common, now if I get two or three in a season I am fortunate. Wallasey on Saturday was almost as bad. *Mamestra albicolon* is pretty plentiful, but the wind and rain during the last month have made them in wretched condition. *Rhodaria sanguinalis* is just appearing.—G. HARKER, Liverpool. *June*, 1890.

Warrington.—My captures at sugar have not been over numerous. *Hadena adusta*, *H. suasa*, *Apamea unanimis*, *Leucania comma*, *Mamestra anceps*, are about the best. On the mosses *Cœnonympha davus* was to be had in fine condition, from June 20th to June 28th, but are now getting somewhat worn. *Aspilates strigillaria*, *Hyria auroraria*, *Lithosia mesomella* and *Viminia menyanthidis* were occupying chip boxes on my way home on the 28th of June. *Euthemonia russula* is just out and in fine condition. In comparing current captures with last year's, I find very little difference in the dates. *Nemeophila russula* was well out on June 23rd in 1889, and was just appearing on June 22nd this year; *Cœnonympha davus* was well out on both dates. My other recent captures are *Cuspidia leporina* and *Cymatophora duplaris*. I picked up a good number of *Bombyx callunæ* on the 27th at Rixton Moss.—J. COLLINS, Warrington. *July 4th*, 1890.

New Forest.—On Saturday, July 12th, I arrived at Brockenhurst, accompanied by my cousin, Mr. Ogden, for a week's collecting. For the first few days, there seemed very little prospect of success, but with the fine weather on Tuesday, things looked much better. *Argynnis paphia* and *Limenitis sibylla* were in lovely condition, but not so plentiful as usual; *A. aglaia* and *A. adippe* occurred frequently, but *A. selene* was nearly over, only a few specimens being taken and these in very bad condition. Three specimens of *Argynnis paphia* var. *valezina* were taken and two more seen. At Rhinefield *Hesperia linea* was very plentiful, but *H. lineola* was not taken, although we heard of half-a-dozen captures. The only insect worth mentioning taken by trunk searching was *Boarmia roboraria*. On all the heaths *Lycæna ægon* swarmed, and *Euthemonia russula*, *Pseudoterpna cytisaria* and *Phytometra ænea* were occasionally kicked up. At dusk we took *Boarmia lichenaria*, *Phorodesma bajularia*, *Hemithea thymiaria*, *Leucania lithargyria*, *Agrotis porphyrea*, and two *Boarmia repandata* var. *conversaria*. Larva beating produced nothing but *Orgyia pudibunda*, but by searching heath and honeysuckle, we found *Saturnia carpini* and *Macroglossa fuciformis*. A few *Ellopia fasciaria* were taken among the pines. We, like Mr. Dannatt (*Record* 3), found sugaring to be an utter failure, and every one we met said the same.—R. E. James, Trays Hill, Hornsey Lane, N.

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[1] *T. munda* comes freely.—ED.

Isle of Wight.—Throughout the past month sugar has continued very unproductive in the woods here, although some evenings have apparently been in every way propitious. I have consequently confined myself to the Downs, where I am glad to say the two best regularly occurring species, *Agrotis lunigera* and *A. lucernea* have put in an appearance on most evenings. The former is as usual none too plentiful, but real hard work along more than a mile of cliff has resulted in a good series, which result is, I think, as well earned as a good series of *P. smaragdaria* is, by the more prolonged but hardly as arduous labour of rearing the same from larvæ. This *Agrotis* in common with *A. corticea* which occurs abundantly on the Downs here, did not begin to come to "sugar" until well out, as after numerous consecutive blank evenings, the first few specimens captured were quite worn; continued emergence has, however, since afforded some very fine specimens including some good "vars." *A. lucernea* has been plentiful, more so I am told than for thirty years in this locality, certainly far more so than for the five or six seasons that I have spent here collecting. The thistle which has usually been so abundant on the cliffs, has this season not only been comparatively scarce, but even when sugared, has had to give precedence, as regards attractiveness to NOCTUÆ, to the common white horehound (*Marrubium vulgare*) and the black horehound (*Ballota nigra*), which latter, in the few patches where it occurs, has been specially frequented by *A. lucernea.*

The bad weather about the end of June was very much against *Setina irrorella*, which emerged freely, and were in numbers on the 26th and 27th June, but were soon washed out and bleached by the heavy rains, which also rather spoiled the first brood of *A. emutaria.* This, in common with most of the other GEOMETERS of the district, occurred in about the usual numbers in its very limited localities.

Flowers of all kinds are becoming very luxuriant now with the few days of sunshine, notably privet-blossom, which is now out very full, and, I think, will interfere with the results of sugar, although I have not yet had an opportunity of visiting it on a favourable night. Some local plants appear this season to occur in fresh spots, *e.g.* the white horehound mentioned above which is plentiful in localities, where, last season, I noticed no traces of it, and I am glad to say, its special "plume" *Aciptilia spilodactyla* has turned up in some of these fresh spots.

I must also note the unusual abundance of the "Cockchafer" on the cliffs, on some of the slopes of which it has been flying in thousands at dusk during the past week.—ALBERT J. HODGES, Freshwater, Isle of Wight. *July 26th*, 1890.

York.—Sugar has been of little use, the best insect turning up being *Cuspidia* (*Acronycta*) *leporina*. Common species as *Agrotis exclamationis*, *Miana strigilis*, *Apamea didyma* have been quite rare with us this season. *Xylophasia polyodon* and *Triphæna pronuba* are not so common as usual. By far the most productive work has been mothing at dusk. At ragwort and ragged robin—especially the latter—I took *Plusia festucæ*, *P. iota* and *P. chrysitis* not uncommonly. I have also taken a fair number of *Collix sparsata* flying low over herbage in a birch wood; in two nights I took 57 specimens before dark. *Chortodes arcuosa* is now occurring in abundance just after dusk, flying amongst grass. *Geometra papilionaria* seems to be not uncommon this year amongst birch. I took 5 specimens in about twenty-five minutes on one night. I have noticed that this fine species is very punctual in its time of flight, seldom occuring much before 11 p.m., from which time until midnight it may be best obtained. *Epione vespertaria* is just coming out. Unfortunately the ground on which this species occurs, has been converted into a game preserve, and the owner looks with anything but a favourable eye on those who venture into his preserves.—W. HEWETT, York. *July 18th*, 1890.

Kildale.—I obtained *Larentia cæsiata* in plenty whilst at Kildale in North Yorks about a fortnight ago. They were on the trunks of the pine trees, and I obtained them by beating the trunks, and catching them as they flew off. *Melanippe tristata* occurred very commonly on the moors near Kildale, on June 26th, flying in the sun over heather. —ID. *July*, 1890.

Dinmore.—On June 26th, I captured at sugar—*Miana strigilis*, *Rusina tenebrosa*, *Noctua festiva*, *Agrotis exclamationis*, *Plusia chrysitis*, *Xylophasia hepatica*, *Bisulcia ligustri*, *Mamestra anceps*, *Xylophasia polyodon*, *Aplecta herbida*, *A. nebulosa* (very common), *Cymatophora duplaris* (only one). (The above order is chronological). Light did not produce any very marvellous results in the way of lepidoptera.—E. W. BOWELL, Hereford. *June 27th.*

Epping Forest and Essex Marshes.—I was very pleased to find that *Heliodes arbuti* still occurs in one of its old haunts at Walthamstow, although I am afraid the spot will soon be built over. A visit for *Phorodesma smaragdaria* larvæ on the banks of the Thames, a few days ago, was very unsuccessful, the high tide having buried most of the foodplant under a stratum of drift. Larvæ are abundant in Epping Forest. I found *Scotosia vetulata* and *S. rhamnata* fairly common on buckthorn last week. They are already nearly full-fed. The rolled up leaves should be picked off for *vetulata*, and when you have finished picking off the spun-up leaves, beat for *rhamnata*.—O. C. GOLDTHWAIT, *Leytonstone. May 27th*, 1890.

Weymouth.—I have not found insects at all scarce on such evenings as I have been out. Unfortunately the weather has been anything but pleasant, but insects have been plentiful.—A. FORSYTH, Weymouth. *June 9th*, 1890.

Birmingham.—The season here has been quite a fortnight earlier than usual. *Brephos notha* was on the wing from the 1st to the 4th of April, whereas last year it was not out till after April 13th. *Lycæna argiolus* has been unaccountably scarce; last season I could have taken it in hundreds, this year I could not get a dozen, but holly blossom was scarce last year and may have influenced the number of the species this year.—H. TUNALEY, Birmingham. *June 18th*, 1890.

Winchester.—Eight pupæ of *Lasiocampa quercifolia* in stock is very comforting, the more so, as, before I began to collect, I found 6 in one day and gave them to boys, and have seen but one since till this year. In each case I found one by accident, and then two more on the same bush. The first three were larvæ, the second three comprised 1 larva and 2 pupæ. The larvæ sit in the day on the stems inside the bush. *Orthosia upsilon* larvæ are fairly abundant under the bark of the willows, although a large number are ichneumoned. *Hadena genistæ* larvæ are feeding well on chickweed, and *Epione advenaria* on sallow. *Asphalia flavicornis* larvæ sometimes spin two leaves together, and sometimes fold one leaf. Mine are pupating between the leaves although a few spin the leaf to the earth. The same remark applies to the way *Toxocampa pastinum* spins up. Some spin up high among the purple vetch, some spin the vetch to the ground, others make a cocoon on the ground. I took 8 specimens of *Apamea unanimis* drying their wings on palings about 8 a.m. When fresh they appear of a richer brown than afterwards. I have taken *Pericallia syringaria* feeding on the low growing honeysuckle in the woods, I found them when after *Limenitis sibylla.*—G. M. A. HEWETT, The College, Winchester. *June 21st*, 1890.

Howth.—The red valerian has been very attractive to NOCTUÆ in my garden at Howth, lately. I have taken at its flowers *Plusia gamma*, *P. iota*, *P. pulchrina*, *P. festucæ*. (I took but one specimen of the latter, on the 18th, an early date I believe), *Chærocampa elpenor*, *Dianthæcia capsophila*, *Hadena dentina*, *Grammesia trigrammica*, *Xylophasia rurea*, *Habrostola triplasia* (some nearly black), and very many others. Great numbers of common moths have come to sugar including *Thyatira batis*, *T. derasa*, and *Hadena thalassina.* A couple of *Acidalia marginepunctata* were found on the 21st, at rest on the rocks, while *A. subsericeata* was on the wing. I had the good fortune to capture 3 fairly good *Luperina luteago* var. *barrettii* and a few *D. capsophila.*—G. V. HART, Dublin. *June 27th*, 1890.

Darlington.—The weather is very bad for collecting. We are getting continuous rain. Thanks to the "Hints" in the *Record*, I got *Sesia culiciformis* at Richmond (Yorks) on June 28th. On Friday last I beat some forty *Caradrina cubicularis* from a haystack (the specimens appear to be covered with a small red spider). I took some larvæ of *Bombyx callunæ* about three-parts grown, and an imago of the same species on June 25th.—W. MILBURN, Darlington. *June 29th*, 1890.

NOTES OF THE SEASON (COLEOPTERA).—The following are a few notes on my captures at Brockenhurst and Chattenden this season.

On my arrival at Brockenhurst on May 26th, the first attraction was the hawthorn blossom on Palmer Lawn. This, being fully out, yielded plenty of the common species, such as *Telephorus hæmorrhoidalis*, *Grammoptera ruficornis*, *Rhynchites æquatus*, etc. *Athous vittatus*, *Grammoptera tabacicolor*, and *Anthonomus pedicularius* were not plentiful, but I secured a good specimen of *Grammoptera præusta.* While searching about, I overheard a boy some distance away remark to another, "Here's a dead crow." At once I noted the spot, and paid a visit there afterwards, which resulted in the addition of some *Silphidæ* and *Dermestidæ* to my captures. Further on, at New Park, *Toxotus meridianus* turned up. Beyond this locality the hawthorn was again in profusion, and here I obtained one specimen of *Silpha 4-punctata.* The water plants were well up, and I searched for *Donaciæ*, but two specimens of *D. sericea* were all I could find. On the stump of a tree *Melanotus rufipes* was discovered hiding in a crevice. Generally speaking, although the growth of herbage, etc., was well advanced, coleoptera were not much, if anything, before the usual time.

Chattenden, June 14th.—My first capture was *Pyrochroa serraticornis* flying across the road; and shortly afterwards, I swept *Molytes coronatus* by the roadside. Several specimens of the local *Campylus linearis* were taken later on, and also *Polydrosus confluens.* The extremely local insect, *Malachius æneus*, was also searched for on the flowering heads of *Dactylis glomerata*, but without success; *Lasia logbosa* and other commoner species were fairly abundant.

On June 19th, in the same district, after wasting some time in the unproductive marshes, I tried the wooded land, and soon spied a beetle flying at a tremendous speed across the glade; this turned out to be *Toxotus meridianus*—a welcome addition to my collection—and, being one of the larger *Longicornes*, looks very handsome when carded. *Œdemera nobilis*, especially the male with its extraordinarily developed femora, was common; and a few specimens of *Dorytimus maculatus* were from sallows, and one *Clythra quadripuncta.* By searching the flowers of the dog-rose three specimens of *Strangalia melanura* were taken; and later in the day, about 6 p.m , I secured the first specimen this year of *Malachius æneus;* I should probably have secured others, but having spent so much time elsewhere, I did not arrive at their locality early enough in the day, when the sun was brighter.—H Cripps, Dalyell Road, Stockwell. *June*, 1890.

On Whit Monday I walked to Sevenoaks with my friend, Mr. Ginne but as we were going to visit some friends, we could not do much collecting. We beat a few hawthorn trees, and the best species I obtained was *Polyopsia præusta*, while Mr. Ginne got *Clytus mysticus*, both were taken near Halstead; nothing further turned up till we came to Riverhead, where I found a dead specimen of *Carabus monilis* var. *consitus;* and, going up Tubs Hill to Sevenoaks, I saw a specimen of *Pyrochroa serraticornis*, which I promptly bottled, running on the pavement. In Sevenoaks I took three specimens of *Xestobium tessellatum.* Mr. Ginne went back to London the same night, and as we were going to the station I captured a good *Deleaster dichrous.* The following morning I walked to Brockley Mount, but did very little collecting, as I had friends with me; however, I captured *Telephorus lividus* var. *dispar*, a specimen of which I captured last season at East Dulwich. In the afternoon I took four *Clytus arietis* and a specimen of *Grammoptera tabacicolor*. During the middle of June I went on an excursion to Deal and Sheerness, and captured some hundreds of beetles in these localities. *Donacia menyanthidis* was fairly common, but I took several *D. nigra* also. In a rabbit's hole I turned up a nice specimen of *Panageus 4-pustulatus*. I also found several specimens of the local *Pogonus luridipennis;* likewise *Tachys scutellaris*, *Dermestes undulatus*, *Hypera fasciculata*, *Grypidius equiseti*, *Limobius mixtus*, *Phytobius leucogaster*, *Poophagus sisymbrii*, etc.—H. HEASLER, 17 Danby Street, Peckham.

Although I do not go in strongly for Coleoptera, I have recently made a few interesting captures. In a shallow pool at Stamford Hill I have taken amongst others the following :—*Cnemidotus impressus*, *Haliplus variegatus*, *H. ruficollis*, *lineatocollis*, *Hydroporus inæqualis*, *H picipes*, *erythrocephalus*, *planus*, *melanocephalus*, *palustris ; Laccophilus hyalinus; Colymbetes fuscus*, *pulverosus; Ilybius fulginosus*, *ater ; Agabus bipustulatus*, *Sturmii*, *nebulosus ; Dytiscus marginalis ; Acilius sulcatus ; Hydrobius fuscipes ; Helephorus aquaticus*. I should doubtless have greatly added to that number were it not for the boys continually disturbing the water in the pool. In another small pond close by I have taken thirteen specimens of *Hydrous caraboides ; Ilybius ater ; Hydroporus picipes*, *palustris ; Haliplus ruficollis*, *lineatocollis*, etc. This pond I learn is now drained by the insatiable builder, and ere long it will be covered with bricks and mortar, like so many other good collecting grounds near London. I have set a few traps for carcase-feeders, and have taken *Necrophorus ruspator ; Philonthus splendens ;* swarms of *Creaphilus maxillosus ; Philonthus æneus ; Silpha rugosa*, *S. sinuata ; Omosita colon* and *discoidea*. Under walls, stones, etc., at Tottenham, I have taken *Carabus nemoralis* and *violaceus*, *Loricera pilicornis*, *Pterostichus picimanus ; Staphylinus cæsarius ; Ocypus morio*. In dung, *Philonthus intermedius*, *Onthophagus vacca ; Aphodius fossor*, *fimetarius*, *ater*, *rufescens*, *prodromus ; Geotrupes stercorarius* ; while I captured *Clytus arietis* on a bank. From a wooden fence last Saturday I got a male specimen of *Ptilinus pectinicornis*. A friend of mine at Bethnal Green asked me if spiders were of any use to me, if so, he had one with a shiny back which I might have if I liked. I thought I would have it, as it might not be a spider; when I got it home I saw it was a very fine specimen of *Mezium affine*. *Bruchus rufimanus* I got from a corn chandler's shop in Bethnal Green ; and from a bake-house in Hoxton, I have taken *Alphitobius diaperinus*, *A. piceus ; Trogosita mauritanica* and *Gnathocerus cornutus*.

Last spring I obtained a good series of *Dytiscus circumflexus* at Gravesend. This year I thought I would try my fortune there again. I went ; and, after about an hour and a half, I found I had 2 *Hydrophilus piceus*, 13 *Dytiscus circumflexus ;* 1 *marginalis*, 2 *punctulatus ;* 2 *Colymbetes notatus* (*fuscus* and *pulverosus* I did not take) ; 4 *Agabus conspersus ;* 2 *Hydroporus parallelogrammus* ; *Noterus sparsus ;* several *Laccophilus hyalinus*, etc. From a pond at Tottenham I got *Hydrophilus piceus* (12) ; *D. circumflexus* (2) ; *Ilybius ater* (1), *fenestratus*, *fuliginosus*, *obscurus* (4 or 5 each) ; *C. fuscus*, *pulverosus* (plentiful) ; also

Agabus bipustulatus and *nebulosus; Hyphydrus ovatus* (8), which I wanted, as well as specimens of *Ranatra linearis*.—F. MILTON, Stamford Hill, N.

CAPTURES OF RARE COLEOPTERA.—A specimen of the rare Coleopteron, *Deleaster dichrous*, was recently captured on the wing in the London district, by Mr. E. A. Newbery. The same gentleman also captured a fine series of *Telephorus translucidus* on July 4th, at Highgate.

Two living specimens of *Trachys troglodytes*, captured by Mr. Battley at Deal, were recently exhibited at the meeting of the City of London Entomological Society. This beetle, though comparatively scarce, appears to be widely distributed.—G. A. LEWCOCK, 73 Oxford Road, Islington. *July 6th*, 1890.

CUSPIDIA (ACRONYCTA) ALNI.—Having long had a desire to see this favourite a little more frequently taken, I put together a few remarks with this object in view. It is widely distributed, although Hampshire seems one favoured haunt. The egg is first lemon-coloured, then mottled with red, and then jet black. The larva is more conspicuous, and should be the object of search. Sitting on the upper side of the leaf, it is more easily seen than most larvæ, and it is easily dislodged. When young it is black and white, and more likely to be free from parasitic larvæ. The larva is to be found throughout July, and pupates usually before the end of August, so that from July 20th to the end of August a special search may be made for it. As it likes sunshine, and mounts up to the top of a bush or hedge to enjoy it, the sunny side of a hawthorn hedge is a likely place to find it. The moth is capable of laying 360 ova, so where one larva is found another should be looked for near. These when found should be provided with cases of elder or raspberry cane, ready bored and dried to pupate in. When by these, and, if necessary, any other means at your disposal, you have got together about twenty pupæ of *alni*, you may wish to multiply your store by breeding. For this purpose you may divide your pupæ in spring, and keep half of them in a cooler place than the rest. Then the ♂'s of the earlier batch will come out first and may be kept as specimens; but the ♀'s of the first batch will come out at the same time as the ♂'s of the later batch, or, still better, a day or two later. Place ♂'s and ♀'s in a soft roomy cage of muslin, and feed every night with honey and water. They should live for ten days or more, and will lay before dying, more or less freely, on the muslin. If the cage can be kept at an open window with a north or east aspect, the prospect of success will be greater. The larvæ thus obtained can be fed in sleeves on the growing trees, if at hand, and I have found lime most convenient. The capture of larvæ from the wild is still necessary to continue the brood in health; and the protection of the larvæ from ichneumons and other foes, including birds, will give the collector exercise for his patience and ingenuity. A few more remarks upon *alni* and the young collector may set to work, either in the way above indicated, or some modification of it, and help to make this rarity more known. I submit with some diffidence that August is the best month to look for this larva, especially in the New Forest and the southern counties; but in the more northern localities, including Yorkshire, captures have been recorded in September. It seems partial to elevated spots, and this may account for some of the later appearances. The larva seems of a thirsty habit, and in dry weather cannibalism is apt to show itself. The use of the syringe in the evening, before the larvæ begin to feed for the night is obvious. The same has been remarked of the larva of *N. trepida.*

Although I have known instances of the larva of *alni* being taken in gardens, the wilder woodlands are its usual haunts. I have indicated hawthorn as a favourite foodplant, but the broad leaves of the lime and wych-elm have their attractions, and the nut no less, and the bramble on a sunny bank. In wet weather the larva lies *under* the leaf as an umbrella.

Beautiful and interesting in all its stages, *alni* is not difficult to rear; and, when once ensconced in a bit of raspberry cane, it is a pupa ready packed for travelling or storing, ready to place in the sun any morning early in June that you wish to bring out the imago. While the wings are still hanging down the ♀ is readily distinguished by a glance at the ovipositor. If the ♀ is kept two nights regularly fed, before the ♂ is put into the cage, the result is more favourable, as a rule; and if your object be to obtain a brood the sacrifice of a few specimens must be made cheerfully. Warm nights and patience to wait are two conditions necessary for success.—(Rev.) B. SMITH, Marlow. *June 30th* 1890.

LARVÆ OF TETHEA SUBTUSA AND TÆNIOCAMPA POPULETI.—Mr. Dutton is quite right (*ante*, p. 100) in his supposition as to the distinguishing character in the habits of the larvæ of *Tethea subtusa* and *Tæniocampa populeti. Subtusa* uses a single leaf only, turning over one side and fastening it firmly around at the edge with silk. *Populeti* as far as my experience goes invariably uses two leaves, one fastened firmly on the top of the other. Both species when at rest will be found coiled round inside, and the best way to find them is to get beneath or below the branches of the trees, when the fastened leaves are readily seen, and in bright weather the larvæ can often be distinctly seen through. The different method of spinning together the leaves is so marked, that a very little practice will enable anyone to know at once which species is secured. At Bishop's Wood, where Mr. Dutton found his larvæ, *T. populeti* seems to be by far the commoner species, but in many districts the reverse is the case.—GEO. T. PORRITT, Huddersfield. *July 30th*, 1890.

HABITS OF THE LARVÆ OF TÆNIOCAMPA POPULETI.—The larva of this species feeds between united poplar and aspen leaves, and is easily seen by holding the leaves up to the light. It occurs about the end of May, and is probably one of our most overlooked species. When it occurs it is generally abundant, at least in the larval state. I have known it to occur in profusion in localities where its presence was never suspected.—C. FENN. *May 9th*, 1890.

HABITS OF VIMINIA (ACRONYCTA) MYRICÆ.—In the course of a conversation with Mr. Salvage, I happened to mention that I took five specimens of *Acronycta myricæ* at sugar on the coast, one night last week. He was somewhat surprised, and tells me that in Rannoch the species is only found on the moors or at some distance above the sea-*level. This, on the other* hand, quite surprised me. I never heard of, or saw *A. myricæ* taken on the moors in Aberdeenshire. We take the larvæ commonly on the coast, and at nearly every roadside, or on the edges of the fields, in fact almost anywhere where there is an abundance of sorrel and plantain, which are its chief foodplants. But they are not by any means confined to these plants, as I have taken them from ragwort, bramble, Scotch thistle, etc., but *never* from sweetgale (*myrica*).—A. HORNE, Aberdeen. *July 30th*, 1890.

[Mr. Reid, of Pitcaple, wrote me most fully about the habits of this species in Aberdeen, more than a year ago. His experience coincides almost entirely with Mr. Horne's.—ED.]

HABITS OF PHOXOPTERYX UPUPANA.—The imago of this species flies very rapidly over the tops of oaks, birches, and other trees in their immediate vicinity. It flies in the sunshine from 2 p.m. or a little earlier, until an hour before sunset. It frequents woods, and appears to be very local. In flying it somewhat resembles *mitterpacheriana*, but the latter flies later in the day, and is heavier on the wing. I had no opportunity of searching for the larvæ until last autumn, but was then unsuccessful. It should feed on oak or birch in September.

I am afraid notes like these on TORTRICES are not very interesting to collectors in general, but I know no group which is so fascinating when once the study is begun. Many a blank day among the Macros is redeemed from unprofitableness by turning attention to TORTRICES, and they are generally easy to rear and set out with a little practice.—C. FENN, Eversden House, Burnt Ash Hill, S.E. *May 9th*, 1890.

[It will be seen from our "Current Notes" that this species has been bred from birch, probably it feeds on oak also.—ED.]

REARING LOBOPHORA VIRETATA.—Instead of this insect being difficult to rear, I have now proved it to be one of the easiest, and in captivity *ivy* is its food *par excellence*. The larvæ stick to the leaf like "grim death," while there is a particle left, devouring ribs, stalk and tissues alike, and do not wander,—in fact those feeding now are uncovered in glass jars.—H. TUNALEY, Birmingham. *June 24th*, 1890.

NOTES ON ASTHENA BLOMERI (PULCHRARIA).—Is this insect double-brooded? I invariably take a few specimens during the second and third weeks in June (generally much worn). From this time until the 3rd week in July not a specimen is to be seen, then the second brood (if such) appears in beautiful condition, at rest on trunks of trees, when it is difficult to take with the net. I have never been able to get ova from females in confinement. The localities in which it is found are wooded hill-sides, with a thin undergrowth of wych-elm.—J. MASON, Clevedon Court Lodge. *June*, 1890.

ATTRACTIVE INFLUENCE OF BALLOTA NIGRA.—Any one wanting *Plusia iota*, *P. chrysitis*, or *Habrostola urticæ* will find them swarming on favourable evenings at the flowers of *Ballota nigra*. I took dozens in a very limited area, and have planted a bed of *B. nigra* in the garden to attract them.—HOPE ALDERSON. *June*, 1890.

TIME OF APPEARANCE OF PLUSIA FESTUCÆ.—I have taken odd specimens of *P. festucæ* at bramble and campion flowers in June. In 1888 I took a fine specimen on June 15th at sugar!! I never heard of *festucæ* being taken in this way before. Last year I got 5 pupæ in July, but these all emerged in August. Is the species double-brooded, or where do the June specimens come from?—J. COLLINS, Warrington. *June 30th.*

[Mr. G. V. Hart records an odd specimen and Mr. Hewett several specimens of this species in this month's *Record* as occurring in June. —ED.]

AGROTIS AGATHINA.—In reply to Mr. H. Tunaley (p. 69), I believe this species is pretty generally distributed in the Midlands, wherever there is sufficient of its foodplant, *Calluna vulgaris.* It occurs regularly in Sherwood Forest, and about a dozen years ago I met with a few larvæ at Breadsall, four miles north of Derby—from these I bred two specimens, which are still in my cabinet, one is the usual light southern form, and the other, intermediate between it and the Perth specimens. For some time I have annually collected a few of these larvæ (which it is well known is one of the most difficult to rear) with hardly any success, but this spring all have pupated, with one or two exceptions, and I am hoping to rear a good series in due course—they were exceedingly common during May and had I anticipated success I could have had a large number.—W. G. SHELDON. *July 21st,* 1890.

LEAF-CUTTER BEES.—Our plants have suffered much this year, both in the garden and our little conservatory, from the "polite" attentions of the leaf-cutter bees—the species I cannot define. They selected exclusively rose leaves and petals of geraniums of the *most vivid scarlet,* leaving the white, pink, and salmon unmolested. The flowers upon which they had operated presented a sorry appearance with the large semi-circular holes cut out of them.—JOSEPH ANDERSON, JUN., Chichester.

DEILEPHILA GALII.—I have bred a few fine *Deilephila galii* from larvæ collected in Switzerland by the Rev. Alfred Fuller, the first emerged on July 10th.—JOSEPH ANDERSON, JUN., Chichester.

MICROPTERYX KALTENBACHII, Stn.—About the end of April I found the imago of the new *Micropteryx* (*M. kaltenbachii*) at Backbury; they flew into the umbrella while I was beating in the afternoon, but were unfortunately not in cabinet condition.—E. W. BOWELL. *May 22nd,* 1890.

EUPITHECIÆ ON JUNIPER.—In reply to Miss M. Kimber (p. 109), "the brown larva with darker dorsal markings" is a variety of *E. sobrinata.* It occurs on the Surrey Downs, and is apparently undescribed in our books.—W. G. SHELDON. *July 21st,* 1890.

CAPTURES ON THE ISLAND OF JETHOU (CHANNEL ISLANDS).—On Wednesday, June 25th, in company with the members of the Guernsey Society of Natural Science, I paid a visit to Jethou, one of the smallest of the Channel Islands, lying opposite the Town of St. Peter Port in Guernsey, and separated from the Island of Herm by a small but deep channel. It is about a mile and a quarter in circumference, of a mound-like shape, and mostly covered with grass and fern, with a few trees and cultivated patches. A thick fog enveloped the island when we landed about 12 o'clock, but it soon cleared off, and the sun was very hot. I took 6 species of Diurni—viz.:—*Pieris brassicæ* (one), *Pieris rapæ* (one), *Epinephele janira* (one), *Cænonympha pamphilus* (commonly), *Lycæna ægon (two); of Lycæna argiolus,* saw several sporting over the tops of some apple trees and captured one. The capture of *Cœnonympha pamphilus* is interesting, as it does not occur at all in Guernsey. Amongst moths, *Euchelia jacobææ* was very abundant, one specimen of *Camptogramma bilineata* occurred, and I took one specimen of *Phytogophora meticulosa* on a small rocky mound called Crevichou, which is connected with Jethou only at low water.—W. A. LUFF, Mansell Street, Guernsey. *July 3rd*, 1890.

KEEPING PUPÆ THROUGH THE WINTER.—Might I inquire in your columns if any one could advise me as to the best way of keeping pupæ of lepidoptera alive through the winter, and whether I ought to moisten them or not? For the sake of experiment, some I have moistened, others I have kept dry. The result of my experiments is that some pupæ always produced moths in due time, under whatever conditions I may have kept them, wet or dry; whilst others have nearly always died. I cannot account for the fact that scores of pupæ of various kinds, that I dug up last autumn, all died in the spring, although I had not moistened them. I opened some of them, and found perfectly formed, but dead and dried up moths inside. I have larvæ of *Notodonta trepida* and *chaonia*, which I have reared from the egg, and shall be extremely disappointed if I am unable to produce the imagines. —F. H. WALLEY DOD, Wellington College, Wokingham. *June 29th*, 1890.

SUGARING.—As sugaring has been one of my chief methods of capturing lepidoptera during the past five years, perhaps some of my observations may prove of service to others. I always use coarse brown sugar when procurable, but have found the old black treacle quite as effective, when unable to get the former. Blackberries, gathered when ripe, and boiled down with sugar, are also an excellent substitute, especially attractive to the XANTHIDÆ. When laying it on it is advisable to carry a small phial of rum in the waistcoat pocket, and add a little every dozen trees or so, which is no doubt preferable to mixing altogether previous to starting. It is also desirable to commence in sufficient time to allow finishing the last tree on the round before dusk; the first hour as a rule being the most productive. A great number of entomologists sugar only a small patch at a convenient height from the ground; my plan is to make a long thin line (the width of the brush) almost to the foot of the tree; which, in my opinion, has its advantages, for, when all the insects are clustered together in a small compass, some that are required are almost certain to escape whilst taking the others; whereas, with the thin streak, the insects are more scattered, and by commencing with the light at the bottom of the tree, almost every individual may be secured. Again, on a windy night the majority of moths are invariably found on the lowest part of the sugar, the higher portion being nearly deserted; many Noctuæ fly close to the ground, and so stand a much better chance of scenting the bait. What sort of weather constitutes a good time for sugaring it is difficult to say with any certainty; for my part, the evenings that have paid me best are those on which there is a slight breeze with light showers at intervals. Sometimes a good many visitors come during a wet night, and even on moonlight nights. The least prolific with me are those during a continued spell of dry weather, when everything seems stagnant, and a shower rouses things up a bit. It is well worth while to sugar a quantity of small limbed trees under the shelter of their branches; they frequently pay in abundance, when the bare trunks of larger growth are little patronised. *Macilenta*, *lota*, etc, seem especially fond of the small trees; I may mention I have taken 8 *quercana* from an oak sapling in one season, and only met with one during the same time on the bare trunk. It is also advisable to shake the brush over low growing shrubs, etc., as they are easily examined. With me, *retusa* is more frequently taken from a drop of liquid on a leaf close to the ground, than from either stems or branches. Changing the locality (unless for special species) is not, in my opinion, much benefit, the first night or two are not as a rule very productive. If the trees are kept constantly sugared, it does not take much liquid to freshen them up, whereas newly painted ones sop up the bait dreadfully. If the same ground is adhered to, every other night will be found quite sufficient, or even a longer interval. Some insects have a partiality for the old sugar (*D. pinastri* is one), sometimes three or four on a stale tree, when they are scarce on the freshly-painted ones, but the strength of the rum having evaporated, insects like *pinastri* and *batis* are very wary, and you have to be quick to capture either. Of course a good many visit the bait during the night or early morning, and there is every chance of their returning to the same spot; for instance, I once noticed a damaged *pyramidea*, and left it alone in its glory. It continued a constant visitor to the same place for nearly a fortnight, some times had taken up its position before I had renewed the sugar.

Another plan of mine, which has proved very successful, and which is handy for anyone possessing a garden, or who can gain access to a private plantation or wood, so that the traps may not be interfered with, is to make several stout cloth bags about a foot long, and two inches or so in diameter, weighted at the bottom to prevent their swaying with the wind, with a wire fixed in top to keep them open, together with a hook to hang on branch when filled with liquid. I find they do not require any attention more than once a fortnight, even in hot weather; it saves no end of time, as they are always in action. Of course they want rum administered each evening, but that difficulty is easily got over by squirting some on from a scent spray, while making the first round. Sometimes, however, the wasps play havoc with the cloth bags during the summer months, so I usually stop up the mouth with a tuft of grass, and finding they are unable to gain access that way, they deliberately commence to eat a hole through the side. This season I have made a few out of old coffee canisters, perforated to allow the sugar to ooze through, and tightly covered with flannel. If the wasps get inside I'll forgive them.—H. ALDERSON, Farnboro'. *June*. 1890.

PRACTICAL HINTS.

By J. MASON.

(*a*) *Nonagria typhæ*. Now in the pupal state; should be sought for in stems of *Typha latifolia* (Reed mace); the infested plants may be known by the centre leaves being yellow and withered; cut the plant low down, strip off some of the green outside leaves, the outlet from which the moth will emerge will then be seen; shorten the stems, leaving five or six inches above and below the point of exit; insert in wet sand in a deep flower pot, covering the whole with a piece of muslin; examine every morning, or late in the evening, when the imagines will most likely be found clinging to the stems or sides of the pot.

(*b*) *Triphæna interjecta.* Now on the wing; will be seen dashing about the sides of hedges as early as four or five o'clock in the afternoon; comes to lavender flowers at night; also found at rest on foliage covered with honeydew; is rather difficult to take on the wing. (All the *Triphænas* want care in setting, as the wings are apt to split with the setting needle.)

(*c*) *Sphinx convolvuli.* After second week in August look for this species at flowers of *Nicotiana affinis*, and bedding geraniums; is on the wing just before dusk, and continues flying for two or three hours.

(*d*) *Chærocampa celerio.* About the second or third week in September specimens may sometimes be seen hovering over the flowers of scarlet geraniums; on the wing as early as seven o'clock p.m. In 1885 I captured two fine specimens, one on the 20th of September, and one on the 24th, missing a second specimen the latter evening.

(*e*) *Nonagria fulva* and *despecta* (*rufa*). The latter rather local; both may now be found in low-lying marshy ground; these insects fly for an hour or so before dusk, may afterwards be found at rest on the stems of rushes and grass.

(*f*) *Orthotelia sparganella* may now be found where the *Sparganium* (Bur reed) abounds, but is rather a local species; it flies just at dusk, and soon settles on its foodplant.

(*g*) *Cerostoma sequella.* This beautiful species may be found at rest on trunks of ash and beaten from the foliage; it is very local.

(*h*) *Phibilapteryx vitalbata.* Towards end of August, the second brood may be found amongst its foodplant, *Clematis vitalba* (the Traveller's Joy); an insect easy to rear, often laying its ova in scores on the setting board; the perfect insect also frequents flowers of bramble, if any are in the vicinity of its foodplant.

(*i*) The beginning of September will be found a good time to commence searching for pupæ of *A. aprilina*, *H. protea*, etc., at the foot of oak trees; all pupæ taken at oak should be specially cared for, as a host of good insects feed on this tree and pupate round the base; the trunks should also be well-examined during September and October in hopes of finding *P. populi*, which spins up in the crevices of the bark; it must be borne in mind that trees standing singly in parks and fields are the most prolific.

(*k*) From the latter end of August onwards, the collector should be on the look out for the autumn "Thorns," which will often be found at rest on, or flitting round gas lamps, and may also be beaten from trees and hedges in the day time.

(*l*) I have found many moths particularly fond of the flowers of lavender, and should recommend any entomologist who has a garden at command to plant a short row of it; cuttings put in during the autumn, and kept in a cold frame, will root during the winter, and be ready to plant out the following May.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*July 24th*, 1890. Several exhibits took place; among others, Mr. Wellman exhibited living larvæ of *Dianthœcia carpophaga*, *D. cucubali*, and *D. conspersa*, also *Cosmia affinis*, bred from larvæ taken at Chattenden; Mr. West, specimens of *Apamea ophiogramma*, taken in his garden at Streatham hovering over privet bloom; Mr. Adkin, normal specimens of *Moma orion* from the New Forest; Mr. Moore, a variety of *Chelonia caja*, with the fore wings almost entirely suffused with brown, and the whole of the hind wings, except the anal angle, black; Mr. Turner, a series of the variable *Noctua festiva* and a very pale variety of the larva of *Biston hirtaria;* Mr. C. G. Barrett a specimen of *Ephestia kühniella*, with the transverse markings very distinct; Mr. Joy, *Collix sparsata* from Wicken, and larvæ feeding on knot-grass (*Polygonum aviculare*); Mr. Bouttell, a variable series of the larger form of *Hypsipetes elutata*, bred from sallow, larvæ taken near Hastings, also two very pale *Mamestra brassicæ*, taken at Catford, and three striking specimens of *Melanippe fluctuata*, taken also at Catford (in the exhibitor's garden), one almost white, with a small central costal spot on each fore wing (var. *deleta*, Ckll.), one much suffused with black (var. *neapolisata*, Mill.), the other a most complete banded specimen showing apparently a reversion to the banded species (if we may look upon these as the most primitive form in this group, as I strongly suspect). Mr. Tutt pointed out that var. *neapolisata*, Mill., although originally named from a specimen taken near Naples, was figured in the *Trans. of the Entom. Soc. of France* from specimens obtained by Mr. Reid at Pitcaple, near Aberdeen, and that the variety, comparatively rare on the Continent, was the usual form in Scotland, while occurring more or less freely all over the British Isles, was especially abundant in the wetter districts; Mr. Jenner Weir pointed out its occurrence at Bournemouth. The knowledge which came to light about the variation of this species seemed to astonish even some of the old collectors. Botanical specimens were exhibited, Mr. Carrington calling attention to the advisability of collecting a considerable quantity of seedheads of *Campanula*, even though no traces of larvæ were evident, as the larvæ of *Eupithecia campanulata*, although not easily found during the day, leave the heads and become abundantly visible during the night, and by keeping them in a bandbox large numbers have been bred; Messrs. Carrington and Tutt called attention to the fact that *Eremobia ochroleuca* might be found during the daytime seated on or just under the flower-heads of *Scabiosa arvensis* and *Centaurea scabiosa.* while Mr. C. G. Barrett suggested picking flower-heads of *Scabiosa arvensis* and putting them in a bandbox for *Eupœcilia flaviciliana;* the latter gentleman also pointed out that the roots of *Eryngium* produced *Argyrolepia maritimana*, while the leaves of the same plant were the pabulum of *Depressaria cnicella.* The information obtained from the botanical exhibits of this Society rarely soars much above the level reached in second-rate text-books, but a distinct advance was made at this meeting in this direction.—ED.

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*July 17th*, 1890.—Mr. Lewcock exhibited *Philonthus decorum*, from Highgate, and *Liophlœus nubilus*, from Claygate; also, on behalf of Mr. Cripps, *Grammoptera prœusta*, *Toxotus meridianus*, and *Silpha 4-punctata*, all from Brockenhurst. Mr. Heasler, *Harpalus servus*, *Calathus fuscus*, *Panagœus 4-pustulatus*, *Amara ovata*, and numerous other coleoptera from the Deal sandhills. Mr. Clark, a box containing various beetles taken at sugar at Brockenhurst, including *Carabus catenulatus*, *Anchomenus junceus*, *Pterostichus niger*, etc. Lepidoptera:—Mr. Bellamy exhibited *Thyatira batis*, *Eupithecia centaureata*, *Hadena adusta*, *Miana arcuosa*, and vars. of *Abraxas grossulariata*. Mr. Clark, *Emmelesia decolorata* bred from larvæ received from the north of Ireland, and a variety of *Fidonia atomaria* from Brockenhurst. Mr. Gurney announced that he had bred several more *Phorodesma smaragdaria* since the last meeting. Mr. Battley had recently obtained some three dozen species of Lepidoptera at sugar in neighbourhood of Southall, including *Nola cuculatella*, which appeared on the wing between 12 and 1 at night, and *Miana arcuosa;* the latter insect crawled up the grass stems at 9.30 p.m., remaining there until 11.30, when the flight took place for about an hour, it then returned to the grass stems. Mr. Lewcock read portions of a letter from Mr. P. W. Jarvis, of Cape Town, describing the methods of capturing certain species of *Cicindela* at South Africa.

August 7th, 1890.—Mr. Heasler exhibited aquatic coleoptera from Deal, comprising *Philhydrus testaceus*, *P. suturalis*, *Hydrochus elongatus*, *Cyclonotum orbiculare*, *Hydroporus depressus*, *H. parallelogrammus*, etc. Mr. Cripps, *Megapenthes sanguinicollis* and *Opilus mollis*, from Claygate; *Hypera pollux*, from Wood Street, Walthamstow; and bred specimens of *Hypera fasciculata*. Mr. Battley, a living female glow-worm (*Lampyris noctiluca*), showing the light very strongly. Mr. Lewcock, *Cicindela sylvatica*, captured at North Camp, Aldershot, on August 4th; also, on behalf of Mr. R. Beck, several *Donacia dentata* from Christchurch. Mr. Milton, *Carabus consitus* and *Molytes coronatus* from Deal. Mr. J. A. Clark had an exceedingly interesting exhibit, consisting of three living specimens of the Mole Cricket (*Gryllotalpa vulgaris*), captured at the New Forest.

Lepidoptera:—Mr. Quail, bleached forms of *Epinephele janira*, *Limenitis sibylla*, *Argynnis paphia*, *Calligenia miniata*, *Pericallia syringaria*, *Gnophos obscuraria* and *P. cytisaria*, all from Brockenhurst. Mr. Clark, four *Boarmia roboraria*, and Mr. Manley a single specimen of the same, from the last mentioned locality. Mr. Raine, preserved larvæ of *Vanessa io*, *Mamestra brassicœ*, and saw-flies. Mr. Gurney, a long series of *Phorodesma smaragdaria*, all bred from larvæ obtained at Essex marshes. Mr. Battley showed eggs of *Pieris napi* and *P. rapœ*, deposited on underside of nasturtium leaves; the difference in the eggs being demonstrated by the aid of a microscope. Mr. Milton exhibited a quantity of insects obtained at Wicken and Brockenhurst, including ten species of butterflies, several NOCTUÆ, GEOMETRÆ (including eight *H. auroraria*), and many species of Diptera and Hymenoptera. Mr. Quail recorded the capture of *Stauropus fagi* by a friend at the New Forest; and Mr. Battley reported the capture of eight *Apamea ophiogramma* on balsam poplar in his garden at Stamford Hill.—G. A. LEWCOCK and E. HANES, *Hon. Secs.*

The Entomologist's Record

AND

JOURNAL OF VARIATION.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 84.)

A*CRONYCTA* (*Viminia*) *menyanthidis.*—This species is one of my oldest and most familiar acquaintances. In the West of Scotland I used to meet with the larva freely in all moorland districts; I have also found it in the North of Scotland, in Wales (north), and in the West of Ireland. It occurs, too, in the North-east of Scotland and on the moors of Lancashire and Yorkshire, but I do not think it is found in the Scotch Lowlands or at all in the South of England. Like all the species of *Viminia,* it is by no means particular as to its food: it certainly has a preference for *Calluna* and *Myrica,* but will eat various grasses and rushes, sallow, bramble, etc., and after, if indeed after, *rumicis,* it is the most omnivorous of the group. *Rumicis* prefers, perhaps, bramble and sallow to anything else. *Myricæ* prefers ling, but will eat various low plants, such as ragwort, plantain, etc., and is partial to wild-rose. *Auricoma* affects bramble and raspberry, whilst *venosa* is more restricted to reed, *Poa aquatica,* and other marsh grasses. Several Continental species of this group (*Viminia*), and its outliers, *Clidia geographica, Simyra nervosa,* etc., feed on species of *Euphorbia,* but this habit does not occur in any of our British species.

The eggs are laid in the typical manner in batches of 20 to 100, closely imbricated, each egg being overlaid by three others. They are flat with about 50 ribs, slightly waved or crenulated; the *secondary or transverse* ribs, so marked in most NOCTUÆ eggs, are in *Acronycta* nearly evanescent, and are represented by the principal ribs being waved or impressed by alternating hollows on either side.

The effect of the eggs being so massed together, and by their superposition bringing the exposed portions of the eggs into nearly the same plane, is to give the whole group a remarkable silky lustre, this is equally marked in a group of *rumicis* eggs, and perhaps most of all in those of *venosa*.

The diameter is 1.1 mm., at first yellowish, they soon become red, and at full colour are perhaps brown rather than red, and get nearly black as the young larva approaches hatching. At their best, they are reddish-brown with numerous paler spots; these spots are very small, and in some specimens very indistinct; towards the centre, 5 to 8 larger spots are arranged somewhat in a circle, those outside this are very small and irregularly disposed. The centre is free from spots and rather darker, and, being where the head of the larva is placed, becomes quite black when the larva is matured.

When just hatched the tubercles are pale, but soon become black, the larva then looking almost entirely black. As it grows, it shows the same pale segments, and much the same colouring as the other species. The pale segments, however, present, not pale colourless, but opaque white areas round the posterior trapezoidal tubercles. The hairs are black, about twice the diameter of the larva in length, and when magnified look dotted or ringed. When full grown in this skin, it is 2½ mm. long; the largeness of the 5th segment, and the smallness of 2 and 11, together with a habit of holding the head prone, already give a *rumicis* outline to the larva. The white of the pale segments, 3.4, 6.7, 10.11, and, to some extent, segment 2, is so opaque and-solid looking as to give the larva a more robust appearance than the other *Viminia* larvæ at this stage. Indications of white circles round the tubercles may be made out on the dark segments; segments 7 and 11 have the dorsal area of the same fuscous-brown as the dark segments. Below the sub-spiracular tubercles all the segments are of a tolerably uniform tint, somewhat paler than that of the dark segments; the 13th segment has some pale marking around the dorsal tubercles, and is not distinctly either of the pale or dark series.

The anterior trapezoidal tubercles have 3 hairs on the 3rd segment, 4 on the 4th and 5 on the others, three of the five being longer than the rest: they are largest on 3 and 4, shortest on 2 and 11, the other tubercles have each 1 hair.

In the 2nd skin, the larva is again at first quite black from the tubercles being set close together. As it grows, the porcelain whiteness around the posterior trapezoidals appears on 3.4, 6.7, 10.11 segments; on 3 and 4 there is also a white dorsal band, which indeed may be traced on the other pale segments, more in some specimens than others. The 5th segment is remarkable for the height on which the anterior trapezoidals are placed, the tubercles themselves being no larger than their neighbours: the tubercles of 11 are still distinctly smaller; the skin is smoky-brown (where not pale), the tubercles black, the anterior trapezoidals very large with 6–8 long black hairs, the others are also large with 2-4 hairs, except the post-spiracular, which dwindles, and has only 1 hair; the hairs are in length about half the diameter of the larva, the marginal tubercles have several paler hairs, the under surface tends to olive or greenish—no trace of lateral line so far. Some of the larvæ are brownish and white, others black and white, looking as if in mourning, and reminding one of *Melanippe hastata.*

In the 3rd skin, they are again at first very black, when full-grown are 9 mm. in length, colour olive-brown; there are some paler hairs on the posterior trapezoidal tubercles; the hairs are two-thirds the diameter of the larva in length, and have a stellate effect from the manner in which they are studded over the tubercles; this effect is characteristic of *menyanthidis* as compared with the other *Viminia* larvæ, and gives it a more Arctioid appearance than any other species has. The pale margin round the tubercles (seen at some stage in all the *Viminia* larvæ) now affects the outer margin of the anterior trapezoidals, the posterior trapezoidals and the sub-spiracular The supra-spiracular are without it. It is most pronounced on the pale segments (3.4, 6.7, 10.11), and on these forms a pale whitish or yellowish sub-dorsal band. The sub-spiracular marks form a nearly continuous lateral line, most marked on the pale segments, broadest and plainest behind the tubercles, and dwindling on the anterior segments. The post-spiracular tubercle is still visible.

In the 4th skin, the *rumicis* form is very marked, perhaps more so than in adult *rumicis;* the 5th segment being very large, and of a deeper black than the rest of the larva, which tapers thence to the head; the 12th segment is also large. As the larva gets full grown (in 4th skin), it becomes paler, and this form is less pronounced. All have now the red lateral line, and some few have lost all other pale markings, but most have a pale ring round the posterior trapezoidals in 6.7, 10.11, some also in 8 and 9, and in some few the pale mark extends to the supra-spiracular. The most conspicuous hairs are black, but pale fuscous hairs are more numerous than the black on the posterior trapezoidal and sub-spiracular tubercles, and some exist on the anterior trapezoidal. In a few specimens these hairs are of the ruddy ochreous tint assumed in the last skin, giving a red tone to the larva and obscuring the black hairs. There is a pale dot, apparently a tubercle, on the anterior margin of each segment (6-12) just opposite the line of the posterior trapezoidal. I have not observed this dot in the other species, probably through not having looked for it. The posterior spiracular still has one pale hair. Some black hairs on 3.4. 5 and 12 are very long and paler towards their tips. The red lateral line is a series of dashes behind the sub-spiracular tubercles on 3-12, and in front of it also on 6-12: head black as throughout.

In the 5th skin (15-20 mm. in length) there are three types. In one the larva is jet black, with only a little paler tint at the incisions, and the hairs are either black or dirty whitish; on 5 and 12 the hairs are entirely black, making these segments look larger, and giving a *rumicis* aspect which the actual relative size of these segments does not justify; in the other two varieties these segments do not look larger than the others, and the *rumicis* outline is now lost.

In the second var., very few hairs are quite black, the majority are pale brown, the skin of the larva is also browner, and the general facies is more nearly that of the adult larva. The third var. is intermediate between these; segments 5 and 12 are blacker than the others, the remaining segments have more black hairs than in var. 2, and the coloured hairs are paler. None have any markings except the red lateral spots, which are dirty brick red in vars. 2 and 3, but in var. 1 of a rich pink red. The spot behind the spiracle is in some divided into two portions, suggesting *tridens*. One larva (var. 1) has no pale hairs on the inner half of the anterior trapezoidal, and looks therefore as if it had a broad black dorsal line; one or two are quite black, and with the carmine lateral line and silver-white spiracles, have a brilliant appearance much in excess of the others.

All make a pad of silk on which to moult, this is indeed invariable throughout the whole genus; one or two of this species made something almost approaching a tent; they never appear to eat their cast skins.

The full-grown larva is 36-41 mm. in length by about 6 mm. in width, the colour is a velvety-black or very deep brown. It is difficult, to me at least, to describe the colours of these larvæ where so much of the effect that one ascribes to colour, is really due to texture. The velvety-black of *menyanthidis* wants the richness that *auricoma* and *alni* exhibit, as if they were clothed in the richest and finest tissues of silken velvet. Some few are really black, and the lateral line of these is a pinken red, making a much more handsome larva than the usual type, which is of a dark blackish brown; paler and less glossy towards the incisions. The segments are rounded from incision to incision, and full in the middle.

The trapezoidal tubercles, the supra-spiracular, the sub-spiracular, and the first ventral tubercles are all about equally developed and form a ring round each segment, the posterior trapezoidal being only slightly out of line behind the others. Each has about 20 pale reddish-brown hairs nearly 2 mm. long, but with several 5 to 6 mm. long and some 7 mm., the longest being on 5th and 6th segments. When stretched out, the larva is thickest about the 9th and 10th segments, tapering regularly in each direction; but when alarmed or sulky, it is thickest at 5 and 6 and 12, *i.e.*, it has still some trace of the *rumicis* form. The tubercles themselves are dull black, the post-spiracular exists, as evidenced by one or two hairs. Underneath, the colour is paler, a deep rufous-brown. On the 2nd segment the three dorsal tubercles are replaced by a black plate fringed with hairs drooping over the head. The head is black and shining, with labrum and palpi dark rufous. The spiracles are of a shining creamy white, that on the 12th segment being the largest. The red lateral line is on the level of the sub-spiracular tubercle, which interrupts it on each segment, the line consists in fact of a series of wedge-shaped marks, two on each segment, the narrow end being towards the tubercle, the anterior mark sloping downwards towards the tubercle, its broad end at the incision, being thus above the end of the other wedge of the next segment, which also slopes somewhat; the posterior one includes a dark spot or depression; the line is dull and obscure, or even wanting, on segments 2.3, 13.14.

The black var. has the lateral line carmine, and not brick-red as in the typical form, just indeed as in the previous skin, and is more brilliant and striking, but has not quite the richness and velvety smoothness of *alni* or *auricoma;* very few indeed even of this variety have all the hairs quite black. The blackest have the red lateral spots occasionally rather smaller, divided into three, that behind the tubercle being divided into two, and not extending forward beyond the 6th segment. As other black ones have the lateral marks in the ordinary form, it may be an accident that this variation in the lateral line occurred in the blackest specimens.

The pupa (Plate II., fig. 2) is the largest and stoutest of this group, 19 mm. long by 6 mm. in width, its outline is nearer to *myricæ* than to *rumicis.* The frontal knobs are lower, rounder and closer together than in the other species. The hoops of the hooped segments form a distinctly raised band, less pronounced than in *rumicis,* but decidedly more so than in *myricæ* or *auricoma.* The anal extremity is larger and rounder than in any of the others; an indication of the points, that are so evident in, say, *rumicis,* may be detected, but they are somewhat uncertain. The bristles are fewer and shorter than in the others, and more easily lost, so that an impression that they are fewer and shorter than in truth they are, is readily formed. Sometimes they look as if they were dwindled spines, suggesting that such may be the origin of these bristles. This appearance is due to their being shorter and rather thicker than on the other species, but on a closer examination it does not appear to be really the fact. In Plate II., fig. 2 c., the 11th segment is shown without a spiracle, this is of course not the case: the artist's intention, no doubt, is, that this segment is a mere sketch without pretensions to accuracy, just as *rumicis* below (fig. 4 c.) is a mere outline except as to the anal armature itself.

The cocoon is fuller and wider than the others, as suits a more robust insect, the silk is dark, but paler than that of *rumicis,* and otherwise its structure is the same as that of the others of the group.

(To be continued.)

ACRONYCTA (CUSPIDIA) ALNI. WANTED.—Dr. Chapman has unfortunately lost his brood of *Cuspidia alni* this year. As there are still a few minor items of structure, etc., to be worked out, he would be thankful to any one who could supply him with the species in any of the earlier stages, and would make any return in his power.—ED.

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE. —Under this head it is proposed to give each month a summary of recent alterations made in the lists of British insects, of the nature of additions or otherwise. We shall be greatly obliged for notice of any omissions that may be made, as it is desired to have the list complete, and well up to date. The nomenclature will be given as in the original record, editorial remarks or alterations being within square brackets. Records in the *Ent. Rec.* will be indexed with the others, for completeness. The year of publication, unless otherwise stated, is always that of the publication of this index. Old records, which have escaped notice, will be occasionally noticed.

LEPIDOPTERA.

Viminia n. g. Chapm., *Ent. Rec.* 26. *Cuspidia* n. g. Chapm., t. c. 27, *Bisulcia* n. g. Chapm., t. c. 28. [In his paper, Dr. Chapman treats these as subgenera, but in the index to the plates, and elsewhere they appear as genera, and the following references have been made: *Viminia rumicis* Chapm., t. c. 29, *V. myricæ* Chapm., t. c. 84, *V. auricoma* Chapm., t. c. 29, *V. menyanthidis* Chapm., t. c. 84, *V. venosa* Chapm., t. c. 84, *Cuspidia tridens* Chapm., t. c. 29, *C. psi* Tutt, t. c. 89, *C. leporina* Hewett, t. c. 132, *C. alni* B. Smith, t. c. 136, *Bisulcia ligustri* Chapm., t. c. 29.]

Polyommatus dorilis Hufn., near Ilfracombe. Prof. Meldola. *Ent. Soc.* Aug. 6, *Nature*, Aug. 14, p. 383.

Hesperia [*Pamphila*] *lineola* Ochs. F. W. Hawes. *Entom.* Jan., p. 3. Essex.

Plusia moneta Fb. *Entom.* 254. R. South, *Entom.* 287, fig.

Tortrix teucriana n. sp. Tutt. *Ent. Rec.* May, 31. Folkestone.

Nepticula torminalis n. sp. T. H. Wood. *Ent. Mo. Mag.*, 209.

Lithocolletis betulæ Z. A. F. Griffith. *Ent. Mo. Mag.* June, 156. Sutherlandshire.

Bryotropha obscurella Hein. *Doryphora obscurella* Hein. *E. M. M.*, May. *Ent. Rec.*, p. 33.

Micropteryx kaltenbachii n. sp. Stn. Wood, *Ent. Mo. Mag.* Jan., 5.

Micropteryx inconspicuella n. sp. Wood, *Ent. Mo. Mag.* Jan., 3.

Brephos parthenias v. *nigra*, v. nov., Tutt. *Ent. Rec.* 34.

Acronycta ligustri v. *nigra* v. nov., Tutt. *Ent. Rec.* 34, near Doncaster.

Theristis mucronella v. *striata*, v. nov., Tutt. *Ent. Rec.* 35.

Apamea leucostigma varr. nov. *albipuncta*, Tutt. *Entom.*, Jan., 13, Greenwich, Aberdeen, etc.; *intermedia*, Tutt, l. c., Wicken, Sligo, near Warrington, with subvarr. nov. *intermedia-albo* Tutt, and *intermedia-flavo* Tutt, l. c.

Zygæna loniceræ varr. nov. *semilutescens* Hewett, and *lutescens* Hewett. *Ent. Rec.* 60.

Z. trifolii v. *semilutescens* v. nov. Higgs, *Ent. Rec.* p. 12.

Lycæna bellargus v. *pallida* v. nov. Austin, *Ent. Rec.* p. 12.

Argynnis aglaia v. *argentea* v. nov. Austin, *Ent. Rec.* p. 11.

COLEOPTERA.

Smicronyx cæcus Boh. W. W. Fowler, *Ent. Mo. Mag.* June, 146.

Smicronyx reichei v. *championis* v. nov. Fowler, t. c. 147. Folkestone.
Neuraphes planifrons n. sp. Blatch. *E. M. M.*, May. *Ent. Rec.* p. 32
Cardiophorus equiseti Herbst. *E. M. M.*, May. *Ent. Rec.* p. 32.

HYMENOPTERA.

Ichneumon haglundi Holmg. Billups, *S. Lond. Ent. Soc.*, March 13.
Prosopis genalis Thoms., *E. M. M.*, May. *Ent. Rec.* p. 32.
Phygadeuon sodalis Tasch., T. R. Billups, *S. Lond. Ent. Soc.*, March 27.
Hemiteles macrurus Tasch., T. R. Billups, l. c.
Glypta cicatricosa R., *G. flavipes* Desv., *G. rubicunda* n. sp. Bridg., see *Ent. Rec.* 127.
Pimpla rufipleura, *Young Nat.*, June. *Ent. Rec.* p. 57.

HEMIPTERA.

Chloriona farinosa n. sp. Buckton, Mon. Brit. Cicadæ, July, pt. iii. p. 76, Haslemere. In the same work are recorded *Philænus spumarius* varr. *fasciatus* Fb., *leucocephalus* v. nov. Buckton, *leucophthalmus*, Linn., and *populi* Fb.
Amblytylus brevicollis Fieb., E. Saunders. *Ent. Mo. Mag.*, Aug., *Ent. Rec.* p. 127.
Pseudococcus aceris Sign., J. W. Douglas. *Ent. Mo. Mag.*, June, 153. Exeter.
Pseudococcus quercus n. sp. Douglas. *Ent. Mo. Mag.*, June, 154. Hereford.

DIPTERA.

Psilocephala ardea F., Brunetti. *Entom.* April, 122. Verrall, t. c. 150. Birmingham.
Leria ruficauda Zett., Brunetti. *Entom.* 123. Verrall, t. c. 150. Reading.
Heteromyza atricornis Mg., Brunetti. *Entom.* 123. Verrall, t. c. 151. Aberdeen.
Sapromyza platycephala Loew., Brunetti. *Entom.* 123. Verrall, l. c. London.
Cecidomyia alpina F. Lw., *C. filicina* Kief., *C. foliorum* Lw., *C. tubicola* Kief, *Diplosis betulina* Kief, *Schizomyia galiorum* Kief, *Leia elegans* Winn., *Chironomus biannulatus* Stæg., *Tanypus guttipennis* V. D. Wulp, (in the Broads), *T. phatta* Egg, (Slapton Lea), *Limnobia stigma* Mg., (N. Wales), *Dicranomyia ornata* Mg., *Chrysotus angulicornis* Kow., *Argyra atriceps* Lw., *Rhingia campestris* Mg., *Oscinis rapta* Hal., Verrall. *Entom.*, May, 152–154.
—J. W. T. and T. D. A. C.

CURRENT NOTES.

A tabulated account of the lepidopterous work recorded in the north of England during the five years, ended 1888, is now appearing in *The Naturalist*.

Mr. Goss, F.L.S., records (*E.M.M.*) a var. of *Zygæna filipendulæ*, with "the forewings of the usual bluish-green colour, but the six spots all black instead of crimson, the hind-wings black instead of crimson with the usual bluish-black border."

The Phylloxera has appeared in one of the vineries of the Royal Horticultural Society at Chiswick.

Mr. C. G. Barrett, F.E.S., records (*E.M.M.*) that the late Mr. Robertson's *Pyralis pictalis* is not unique, but occurs in Japan, Sumatra, Ceylon, India, etc.; also that the species has several synonyms.

I understand that some five or six hundred specimens of *Hesperia lineola* have been captured in Essex this year, by about half a dozen collectors. No doubt it is a very common species in its favoured haunts.

I understand that another specimen of *Plusia moneta* has been captured at light. This one was taken near Reading.

A comparatively large number of *Agrotis pyrophila* has occurred at Portland this summer.

At the last meeting of the Entomological Society, *Polyommatus dorilis* was reported as having been taken in 1887, near Ilfracombe.

NOTES ON COLLECTING, Etc.

CALLIMORPHA HERA IN SOUTH DEVON.—As it has been asserted by some entomologists that the appearance of this grand species was owing to artificial means, and that it would in due course disappear again, I determined to see for myself by paying once more an early visit to the old locality, where I had the good fortune to take it for several years. I am happy to say that on August 6th I saw two, of which I captured one; later on I obtained two more, one of which deposited ova. Having arranged to start for the Isle of Man, I had to leave South Devon on August 12th, which would just be the time for the general emergence of *C. hera.* I have taken some pains to ascertain that for many years this insect has been fairly common between the long range of Exeter and Teignmouth, a man at the latter place having captured it each year at light. It is often seen at harvest time, when probably more disturbed, the boys are in the habit of knocking them down with their caps in corn fields. Beaten out of holly bushes to which they mostly resort, they are rather difficult to capture, as they fly high and rapidly.—J. JÄGER, 180, Kensington Park Road, Notting Hill. *September*, 1890.

During my stay of two weeks in South Devonshire, I was so fortunate as to obtain three living imagos of *Callimorpha hera,* the Jersey Tiger. These fine moths were all beaten from the same hedge, and taken (though on different days) by my son, A. C. Hollis, some ten or twelve miles the other side of Exeter, in the neighbourhood of Dawlish. The first (which seems to be a female) was captured in my presence on August 23rd, while flying in bright sunshine. The insect, on being disturbed, flew suddenly and swiftly across the road, making for the opposite hedge. Fortunately my son had his net ready, and succeeded in capturing the specimen while on the wing. The red of the hind wings looked very beautiful as it flew past me, and I supposed it to be either *Arctia caia* or *Callimorpha dominula*, but a glance into the net disclosed its real nature. The second specimen (which I believe to be a male) was taken on August 25th, and is slightly larger, and even finer than the first. The third, of smaller size, was captured on August 30th. No other specimen was seen, though the hedge was beaten carefully nearly every day. An entomological friend saw the insects shortly after their capture (the last one alive) and gave it as his opinion that the hind wings differed slightly from those of some that he had taken last year in the islands of Jersey and Sark.[1] I have had, as yet, no opportunity for making the comparison.

I am not aware that there is on record any authenticated account of the capture of three specimens of *Callimorpha hera* in England in one week, and it appears to me a most remarkable occurrence, and although Newman, Stainton, Knaggs and many other authorities do not include the insect in their British lists at all, I hope that in future this insect will find its place among British Lepidoptera. The appearance of *three foreign* specimens cannot be accounted for by any of the familiar theories; and, even if we assume that a female was brought over last autumn, still the ova must have hatched and the larvæ fed up and hibernated in this country. Besides, where *three* are taken, there are probably *more behind.* I should be curious to hear of any other captures being made this season. I intend to exhibit my specimens at an early meeting of the City of London Entomological and Natural History Society, and shall be glad if any one can throw any light on the subject of their appearance this year in Devonshire.

It may be interesting to observe, in conclusion, that in Merrin's Lepidopterist's Calendar are to be found the following notes:—(1). Under "*larvæ*" for September, "*C. hera.* Doubtful native. On the continent it feeds on *Echium vulgare* and various low plants." (2). Under *imagos* for August, "*C. hera.* Has occurred at sugar at Exeter." There seems reason to believe, then, that the Exeter district is this insect's headquarters in England.—GEORGE HOLLIS, London. *September*, 1890.

[Mr. Hollis seems to be unaware of Mr. Jäger's captures in the same district spread over the last few years. From ova obtained, Mr. Tugwell, Mr. Jäger, and others have bred specimens, undoubtedly native as far as the *bona fides* of Mr. Jäger's captures are concerned. Great doubt has been expressed by some lepidopterists, concerning Mr. Jäger's specimens, but I have not the remotest doubt as to their authenticity myself. I have printed Mr. Hollis's note in full, as affording additional proof of the genuine character of Mr. Jäger's captures.—ED.]

CAPTURE OF LITHOSIA MOLYBDEOLA.—I have to record the capture of a few specimens of the above species some miles from Manchester. The few I took were captured after dark on grass stems by searching with a lantern.—J. COLLINS, Warrington. *August 27th*, 1890.

CAPTURE OF LITHOSIA CANIOLA.—On the 26th July I took an imago of *Lithosia caniola* on the identical ground where Mr. Barrett discovered the moth in 1860. It was taken in large numbers by Mr. Edwin Birchall and other entomologists on the same ground afterwards, but as far as I can discover it had not been seen here for the last fifteen years or so. The larvæ used to be abundant on *Lotus corniculatus*, but have not been found lately. It is satisfactory to discover that it has not been extirpated, though I fear it is very scarce.—G. V. HART, Woodside, Howth, Dublin. *August 28th*, 1890.

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[1] *There is a great deal of variation in the colour of the hind wings from bright red to yellow (var. lutescens).*—ED.

NOTES OF THE SEASON (LEPIDOPTERA).—*Morayshire.*—I spent a few days in Morayshire at the end of July. Among other species I met with the following:—*Acidalia fumata*, *Ellopia fasciaria*, *Larentia cæsiata*, *Thera simulata*, *Eupithecia sobrinata* and *Boarmia repandata* (grey forms). By beating the junipers, *Gelechia boreella*, and *juniperellus* were to be obtained, but they were not plentiful and too much worn for cabinet use. Larvæ of *Endromis versicolor* and *Asphalia flavicornis* were not uncommon on the small birch trees. Larvæ of *Eupithecia togata* could be seen feeding on the fir cones, but they were very small. *Retinia resinana* larvæ were common on the fir trees. Sugar did not pay particularly well, although "sugar" aided by ragwort flowers produced *Triphæna subsequa* (a nice series), *T. orbona* (ranging in colour from pale grey to an inky black form—in a few specimens both the upper and under wings were black), *Agrotis corticea* (some nice vars.); *Caradrina alsines*, the type was common, and I took three melanic specimens; *Heliothis marginatus* (a few); *Xylophasia polyodon* swarmed as usual, about one in twelve being black; *Triphæna pronuba* abundant, but not differing from the Aberdeen specimens. *Noctua festiva* var. *conflua*, *N. triangulum*, *Triphæna fimbria*, *Agrotis nigricans* (almost black), *Noctua dahlii*, *N. umbrosa*, *Orthosia suspecta*, and many other NOCTUÆ were more or less abundant. —A. HORNE, Aberdeen. *July 30th*, 1890.

Aberdeen.—During August sugar has paid very well in the woods near here. A few evenings ago I took *Noctua neglecta* var. *castanea*, and *Orthosia suspecta* rather abundantly; *Calocampa solidaginis* and *Noctua glareosa* were common. *Aplecta occulta*, *Noctua sobrina*, *N. dahlii*, and *Epunda nigra* also occurred, but not so common as the other species mentioned. I understand that both *A. occulta* and *N. sobrina* have been rather common throughout the county this year. Strange to say, sugar has not been working at Forres this month. I was there on Friday in hopes of getting *Noctua depuncta*, but was disappointed; the only NOCTUÆ that occurred were single specimens of *Mamestra furva*, *Aplecta occulta*, *Epunda nigra*, *Noctua glareosa*, and *Hydrœcia nictitans*. *Agrotis cursoria and A. tritici* are not at all common yet on the Aberdeenshire coast. They generally swarm before this time.—A. HORNE, Aberdeen. *August 25th*, 1890.

St. Anne's-on-Sea.—The weather here has been very bad, nothing but rain and a strong wind for two or three weeks. On Tuesday, at Lytham, we got a few species, including *Lithocolletis messaniella*. A few good *Agrotis cursoria* have turned up, but only six *A. præcox*. *Dictyopteryx holmiana* is only just coming out. I have not yet seen *A. nigricans*. *Peronea aspersana*, *Ædematophorus lithodactylus*, *Depressaria nanatella*, and *Choreutes scintillulana* have occurred rather freely on the sandhills this year.—HOLMES BAXTER, St. Anne's on-Sea. *August 22nd*, 1890.

Lyndhurst.—I went down to Lyndhurst on July 29th for a week's collecting. *Selidosema plumaria* was very abundant on the heather, although only one female was captured. Butterflies swarmed in all directions, *Epinephele janira*, *E. tithonus*, *E. hyperanthus*, and *Cænonympha pamphilus* being specially abundant. *Argynnis paphia* was very common, and a few *Limenitis sybilla* and *A. adippe* also occurred. *Satyrus semele* was fairly abundant just outside the pine plantations near the Lyndhurst Road Railway Station. Sugar was very unprofitable, only one *Thyatira derasa*, a few *Xylophasia polyodon*, one *Cosmia trapezina* and one *Apamea oculea* being the only visitants.—HENRY A. HILL. *August 16th*, 1890.

Horrabridge.—One night recently, I captured at light from 11 p.m. to 1.30 a.m. during rain, from 80 to 100 insects, including the following:—*Plusia iota*, *P. chrysitis*, *Noctua festiva*, *Rusina tenebrosa*, *Agrotis exclamationis*, *A. porphyrea*, *Dianthœcia carpophaga*, *D. cucubali*, *Xylophasia rurea*, *Abrostola urticæ*, *Grammesia trigrammica*, *Sphinx ligustri*, *Orgyia pudibunda*, *Notodonta camelina*, *Selenia lunaria*, and many others, principally Geometers.—J. N. STILL, Horrabridge, Devon. *July 14th*, 1890.

York.—The rains of the last ten days have entirely put a stop to any kind of collecting, but sugar has been very unproductive this year, so far, a few *Leucania pudorina* and one *Acronycta* (*Cuspidia*) *leporina* being the only species worth recording. I found *Hydrelia unca* flying in Askham Bog, but owing to the very strong wind which prevailed at the time, and the nasty habit the species has of creeping quite to the roots of the long grass, I was prevented from obtaining any very good examples.—S. WALKER. *July 4th*, 1890.

Armagh.—On May 24th I went down to Churchill, and on a heathy bog there captured a number of *Thecla rubi* and *Fidonia atomaria*, also a solitary *Anarta myrtilli*, sitting on the top of a bunch of heather. The day was windy, which was adverse. This month I have done well at sugar, as far as numbers go, but I do not think any species calls for special remark.—(Rev.) W. F. JOHNSON, Armagh. *June 27th*, 1890.

King's Lynn.—At the end of May I spent two days in the above neighbourhood, but the weather might have been more suitable. My captures included *Tephrosia biundularia*, *T. punctulata*, *Macaria liturata*, *Thera variata*, *Emmelesia affinitata*, *Cidaria corylata*, *Tortrix ministrana*, *Phoxopteryx uncana*, etc.—GEO. BALDING, Wisbech. *June 24th*, 1890.

Somerset.—Up to this date, the present collecting season is not by any means an improvement on last. Sugaring is of no service; there is great abundance of honey dew on the foliage, which may possibly account for the dearth of insects at sugar. The fruit trees in some of the market gardens and orchards are bare of foliage as in winter, apples and cherries suffering most, which will only bear a very partial crop in consequence.—J. MASON, Clevedon Court Lodge, Somerset. *June 11th*, 1890.

Essex.—I visited Epping Forest yesterday. *Argynnis euphrosyne* are nearly over, and *A. selene* not to be seen. I worked chiefly for *Eurymene dolobraria* which I heard had been taken there this summer, and succeeded in beating a fine specimen from a pollard beech. *Ephyra trilinearia* were fairly plentiful in the same place, with a sprinkling of *Corycia temerata*, *Iodis lactearia*, *Asthena candidata*, *A. luteata*, *Acidalia trigeminata*, etc.—A. BATTLEY. *June 19th*, 1890.

Wiltshire.—I have been working for the last three weeks in the Marlborough district, and thanks to the aid of a local collector, have done very well. Sugar is just now most productive, and after the continued blanks last year, it is most refreshing to meet with fair sport. Near Marlborough I took *Leucania turca*, *Aplecta herbida*, *Acronycta* (*Cuspidia*) *leporina*, *Hadena pisi*, *H. thalassina*, *H. dentina*, *Euplexia lucipara* and *Neuria saponariæ*, besides any number of the commoner NOCTUÆ. I netted a good series of the clematis-feeding *Eupitheciæ* —*E. isogrammaria*,[1] and a few *E. coronata*. These two species need a good deal of working for, simply beating the clematis avails nothing. The only method is to thrust in the stick and regularly churn the clematis; then wait for a few minutes and beat in the ordinary way. The only other Geometers worthy of mention that fell to my lot were *Acidalia subsericeata*, *Eupithecia valerianata* and *Emmelesia blandiata*. Among the stems of hemp agrimony, I found a good number of *Eupœcilia rupicola*, and one specimen of *Pterophorus microdactylus*, whilst on tree trunks in Savenake Forest I found several specimens of *Tinea fulvimitrella*, and I took one *Anesychia decem-guttella* at light. My moth trap which has been put out for me while I have been away has added a nice number of insects to my store.—(Miss) M. KIMBER, Newbury, Berks. *July 1st*, 1890.

Aberdeenshire.—As far as my experience goes, I do not think this is an abnormally good year for insects, Micros even being decidedly scarce. A trip to Ben-na-chie only produced about a dozen TORTRICES, a few *Cœnonympha davus*, *Eupithecia nanata*, *E. pumilata* and *E. satyrata*. Pitcurrie Moss has given me a few fine *Melitœa artemis*. "Treacle" has attracted *Cymatophora duplaris* (2), *Acronycta* (*Viminia*) *myricæ*, *Leucania lithargyria*, *Xylophasia rurea* (light and dark), *X. polyodon* (dark), *Apamea basilinea*, *A. gemina*, *Miana fasciuncula*, *Rusina tenebrosa*, *Triphœna orbona*, *Noctua plecta*, *N. C-nigrum*, *N. brunnea*, *N. festiva* var. *conflua*, *N. rubi*, *Hadena adusta*, *H. pisi*, *H. rectilinea* (3), and others; and by "mothing" I have turned up *Boarmia repandata*, *Cabera pusaria*, *Emmelesia alchemillata*, *Eupithecia pygmeata*, *Coremia munitata*, etc., but so far no rare things. Several of the foregoing are very common, especially dark *X. rurea* and *H. adusta*, which I think accounts for the idea that this is a particularly good year (in the north) for sugar.—WM. REID, Pitcaple, N.B. *July 5th*, 1890.

Malvern.—I managed to get three or four days at the end of May and beginning of June at West Malvern. The weather was not favourable, and insects not plentiful. The following is a summary of my captures:—*Leucophasia sinapis* (several), *Minoa euphorbiata* (several), *Ephyra omicronaria* (only three or four, this is generally common), *Eurymene dolabraria* (one, I have only twice before taken the species in this district), *Numeria pulveraria* (two, sometimes fairly common). The common species, however, with the exception of *Syrichthus alveolus*, *Melanippe montanata*, *Acidalia remutata*, and *Iodis lactearia*, were comparatively scarce. During the latter days of June and the early days of July, sugar here was most prolific, *Triphæna pronuba* and *Agrotis exclamationis* literally swarmed; *Aplecta advena* and *Agrotis corticea* being also fairly plentiful, whilst *Timandra amataria* was common at dusk.—(Rev.) E. C. Dobrée Fox, Tewkesbury. *July 11th*, 1890.

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[1] This species can be bred in great abundance. During August look over the clematis flower buds. Pick off those with a little round hole in them, and pack away in a large flower pot with earth at bottom. Hundreds may thus be obtained with very little trouble.—ED.

Warrington.—The nights here have been so cold and damp that I have been unable to do much this season. The only good insect I have taken being a worn specimen of *Heliothis armiger.* Is not July a curious time for this species, especially in worn condition?—Thos. Tunstall, Warrington. *July 12th*, 1890.

Devonshire.—At Braunton Burrows, a locality worked some 30 years ago by Mr. G. F. Mathews, a day spent on the sandhills was spoilt by heavy rains. There are many wild flowers growing there, amongst others a few mullein plants, on some of which were larvæ of *Cucullia verbasci.* I collected twenty, and saw a few of the striped pupa cases of the ichneumon that infests them. I visited Lundy Island, where I have been pretty often, and turned up nothing new; the insects are mostly smaller and paler than on the mainland. Very misty weather prevails and south-west winds sweep the island, which is a second "Heligoland" in many respects. The geological formation is partly of granite like Cornwall, and partly slate, like the Ilfracombe coast.—J. Henderson, Streatham. *July 26th*, 1890.

Kent.—Has anyone observed the failure of sugar again this season? The last twice I have applied the bait I have only seen on it four moths, two *Dipterygia pinastri* and two *Rusina tenebrosa.* I am well aware that numbers of the Noctuæ usually captured in this way, have been out for a long time. Some of them come to light, but they won't put in an appearance at sugar. The only moth I have attracted in abundance this way is *Miana fasciuncula.* The excessive abundance of aphides is, to my mind, the solution of the enigma. I find appearances this year anything but normal. Some species are a fortnight earlier than usual, others equally late. Generally speaking, I don't find insects as plentiful as in ordinary seasons.—C. Fenn, Lee, Kent. *June 26th.*

Essex.—Larvæ of *Bombyx castrensis* were very common on Wakering Marsh, but not seen elsewhere. These larvæ are not at all particular as to food. I observed many more on *Statice limonium*, *Atriplex portulacoides*, and I think *A. littoralis*, as well as on various coarse grasses than on *Artemisia.* If placed in a cage with birch, rose, and seaworm-wood, they show a marked preference for the rose and birch, particularly the former, for which, I learned from Mr. Mera, the larvæ have a great liking.—F. G. Whittle, Lothbury, E.C. *July 7th*, 1890.

Howth.—With reference to my note in the last number of the *Record* I have added another *Plusia* to those then mentioned as captured in my garden, viz.:—*P. bractea*, one specimen only; *P. pulchrina* was the most abundant. Common moths have been extremely abundant at sugar, and such troublesome fellows as *Xylophasia monoglypha*, etc., fight and push each other about over the sugared patches every night; but I have seen none of the *Plusias* at sugar. They are chiefly about the flowers of the common turncap lily. With me light has not been productive this season. I think I have *Agrotis lunigera* (taken at sugar), but am not at all sure about it. I also took *Aplecta herbida*, *Gonophora derasa*, *Thyatira batis*, etc.—G. V. HART, Dublin. *July 16th*, 1890.

Reading and New Forest.—I have been taking a number of larvæ of *Eupithecia pulchellata.* I looked over hundreds of blooms in the neighbourhood of Reading, but with no success, till a friend told me the infant larvæ always draw together the mouth of the bells. Having once found out this habit, I had no difficulty in obtaining larvæ. I found the foxgloves on the edge of the wood and in open glades more productive than those in the thicker parts. Two lovely hot days in the New Forest produced long series of *Limenitis sibylla* and *Argynnis paphia*, including a black var. of the former, captured by a companion, smaller than the type, but unfortunately much torn. I also boxed one beautiful variety of *Boarmia roboraria* from a tree trunk, a female, almost black. We only saw three var. *valezina*, of which one was captured.—(Mrs.) E. BAZETT, Reading. *July 19th*, 1890.

Lee, Kent.—At sugar still nothing but the commonest NOCTUÆ ; but I have captured one or two *Apamea ophiogramma* at light, and by mothing, a few *Phorodesma bajularia*, and have bred long series of *Ephyra pendularia* (showing lovely pink forms), *Platypteryx falcula*, *Cosmia affinis*, and a long series of the *Ephestia* from rice, as previously mentioned in the *Record.*—C. FENN. *June 23rd*, 1890.

Bristol.—I have paid two visits to the locality for *Acidalia holosericata* (on 2nd and 4th of July), but found that many of the specimens were worn and ragged; it does not last long in its rather exposed situation, but, whilst it lasts, is very abundant in one particular spot. It flies rather early in the evening and is very feeble on the wing.—GEORGE C. GRIFFITHS, Clifton, Bristol. *July 19th*, 1890.

New Forest.—I got a black var. of *Limenitis sibylla* here (New Forest) the other day with a few *Boarmia roboraria*, *Hyria auroraria*, and, of course, var. *valezina* with many commoner things; but many of the Forest species were altogether missing. I have also bred *B. roboraria* from larvæ beaten out at home in May. *Anticlea sinuata* and *Heliothis marginatus* appeared in better numbers than usual, and I have taken *Dicycla oo* at Reading for the first time.—W. HOLLAND, Reading. *July 23rd*, 1890.

Staffordshire.—*Nola cristulalis* has held its own until May 31st this year as a North Staffordshire insect, by the occurrence of a single specimen, but on that date, an excursion of the Field Club to Bishop's Wood turned up the species in profusion, often three specimens being found on a tree. When once seen it is a very conspicuous insect, although it greatly resembles the lichen on the tree trunks in colour.—E. D. BOSTOCK, Stone, Staffordshire.

London District.—A specimen of *Apamea ophiogramma* was captured about 9 p.m., in a garden near Haverstock Hill a few nights ago.—HENRY A. HILL, Haverstock Hill. *June 27th*, 1890.

London District.—A visit to Chingford on 22nd June produced about two dozen *Procris statices*, other insects being rather scarce. Sugar in Highgate Woods has produced *Thyatira batis*, *Gonophora derasa*, *Aplecta nebulosa*, *Xylophasia rurea*, *X. polyodon*, *X. lithoxylea*, *Euplexia lucipara*, *Leucania comma*, *Grammesia trilinea*, *Miana fasciuncula*, *M. strigilis*, *Triphœna pronuba*, *Noctua augur*, *N. triangulum* *N. ditrapezium* [is not this a mistake?—ED.], *N. brunnea*, *N. festiva*

Cosmia trapezina, *Hadena thalassina*, *Mamestra persicariæ*, *Dipterygia pinastri*, *Acronycta* (*Cuspidia*) *psi*, and others.—H. M. BELLAMY. *July 7th*, 1890.

Paisley.—The *Plusia* family have been rather common this year, and are not quite over yet.—A. M. STEWART. *July 23rd*, 1890.

Dutton.—On Bank Holiday I left home at 6.30 a.m. and drove twelve miles in the rain to Dutton. The weather cleared up about 10 a.m., and I at once took a walk to look for *Retinia margarotana*. The search was fruitless; the wet grass and heath soon made my net a wet rag, and I was glad to get into the open to dry it. *Amphisa gerningana* began to fly, and I netted 39 males and 1 female, and there were plenty of *Penthina sauciana*, *Pædisca occultana*, *Peronea caledoniana*, one *Plusia interrogationis*, and others. Returning to the Inn, I went after *Trifurcula pallidella* and took two fine ones, together with some *Phygas bisontella*. At 8.30 I drove home having filled some 150 boxes.

On August 10th, I went again for *Retinia margarotana*. The season appears to be anyhow as to dates of appearances, being very late. I filled 120 boxes, although there was a high wind. My principal captures were:—*P. occultana*, *A. gerningana*, *P. sauciana*, *G. geminana*, *P. caledoniana*, *Crambus margaritellus*, *Carsia imbutata*, *P. bisontella* and one *Gelechia similella*, a rare species here; a cold wind in the evening prevented the capture of *T. pallidella*. I found all the *P. occultana* on Scotch fir, sometimes as many as six in my net at once, by sweeping the half-dead twigs. The moths are so like the dead twigs in colour that there is no doubt they settle on these for protection.—J. B. HODGKINSON, Ashton-on-Ribble. *August*, 1890.

Castle Cary.—We have had a very cold, wet season, and captures have been very few and far between. My own experience is very bare. *Vanessa cardui* was last year very abundant; nct one seen this year. *Plusia gamma*, usually a pest, but scarce this year; on the other hand, I have been fortunate in making some additions to my local list. Sugaring I have not tried to any extent.—W. MACMILLAN, Castle Cary, Somerset. *July 24th*, 1890.

London District.—At Wimbledon, on June 5th, *Coremia designata* (*propugnata*) was unusually plentiful; on the 8th, at Chingford, it was getting worn. On June 24th, the first *Zeuzera pyrina* (*æsculi*) was taken, confirming my forecast in the *Entomologist* last year, as to the date at which they should be looked for. Emergences continued till July 26th. On June 29th, *Eupisteria obliterata* was taken among alder at Chiselhurst—the first time I have met with this species near London. On July 7th, I was with Mr. A. J. Hodges at Highgate Woods, when a dark variety of *Aplecta nebulosa* was taken by him. On July 10th, sugar was very attractive at Highgate Woods; two *Thyatira batis*, and one *T. derasa* were taken among others; the day had been warm without rain, sky overcast, but rain came on about 10.30 p.m.—F. J. BUCKELL, Canonbury Square, N. *July 29th*, 1890.

Howth.—I have just returned from a visit to Howth, the results of which are rather small, but not so bad for a week's rainy weather. We took a nice yellow form of *Bryophila perla*, indeed, all the *B. perla* we got were rather different from our ordinary form. We also took a fine form of *Zygæna filipendulæ*. We were at Howth at a bad time of the year, too late for most of the special insects, but turned up *Stilbia* *anomola.* I don't know whether this is a new locality.[1]—GEO. A. HARKER, Liverpool. *August 8th,* 1890.

Portland.—Since the beginning of July, sugar has been almost useless here, and this is always so every year, whilst the wild sage (which grows all over the island) is in bloom, these flowers being the great attraction for NOCTUÆ and for some geometers and micros, *Agrotis pyrophila* has occurred here plentifully this season, and between the 2nd and 26th July I obtained a nice series, all taken at the wild sage flowers. I do not think *A. pyrophila* is attracted by sugar as a rule, though I fancy I took one in 1888 by that means, the only one I obtained that year, and did not see it all last season. I am informed that it only occurs here in any numbers at intervals of four or five years. *Agrotis lunigera* and *A. lucernea* were both out as early as July 2nd, and were both also taken at the wild sage. The locality is very rough and rocky, and as I did not take a net with me when working it (preferring a stout stick) I had to neglect a number of other things in order to get the three named insects.—E. W. BROWN, Portland. *August 11th,* 1890.

Warrington.—I seem to have done nothing with sugar lately, although I have tried repeatedly at Rixton Moss to allure *Orthosia suspecta,* but in vain, and am beginning to think I shall not get it at all this year. Matters are not much better nearer home, the NOCTUÆ taking to honey-dewed sallow leaves and deserting the sugar altogether. On August 12th I bred two splendid *Agrotis agathina* from larvæ, of which I collected a good number in May, but, owing to parasites and my inexperience with these difficult larvæ, I lost all but a very few. I shall shortly visit their haunt, when I trust I shall be more successful. I should be most thankful for any advice as to how to treat these larvæ.—J. COLLINS, Warrington. *August 18th,* 1890.

Gloucestershire.—I am glad to see that *Lycæna arion* still exists on the Cotswolds; I took three very fine specimens this year. *Sesia formicæformis* came out in the few sunny days we had about the middle of June, though not in great numbers.—M. STANGER HIGGS, Upton St. Leonard's, Gloucestershire. *July 30th,* 1890.

London District.—I have found sugaring most unproductive here this season; usually I take a number of common NOCTUÆ in my garden, but this year I have seen next to nothing. Among the least common that I occasionally take are *Apamea unanimis, A. gemina, Miana literosa* and *Dipterygia pinastri.*—A. W. MERA, Forest Gate, E. *August 15th,* 1890.

Clevedon.—So far, I consider this the least satisfactory of any season since I commenced collecting; with a few exceptions, insects have been unusually scarce, and it is quite disheartening that night after night one's exertions should meet with so little success. Of good things two of the most abundant species have been *Nudaria senex* and *Asthena blomeri;* in a low damp meadow near here, which, I believe, is the only locality in the Bristol district where *N. senex* occurs, it literally swarmed during one particular evening in July, the day had been hot and fine, and immediately the dew began to be deposited (about 7 p.m.) *N. senex* began to fly by scores, the grass and rushes were full of them, fluttering up the rush stems and then taking flight for a short time; in half-an-hour or so all were again at rest on the herbage, and not a single one could be seen on the wing. *Asthena blomeri*—The second brood (?) of this insect began to appear about the third week in July, and specimens in good condition were to be met with in two localities in the same wood, distant a mile apart, up to last Friday (August 15th), when we experienced a strong gale with heavy rain, which seems to have completely destroyed what remained.—J. Mason, Clevedon Court Lodge, Somerset. *August 18th*, 1890.

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[1] I believe this was recorded by Messrs. Birchall and C. G. Barrett.—ED.

Sutton Park.—Sugar was fairly productive in this locality during June, and till about the 20th of July. *Thyatira batis*, *Viminia rumicis*, *Xylophasia rurea*, *Rusina tenebrosa* and *Euplexia lucipara* came freely till about the 28th of June, when *Noctua plecta*, *Aplecta nebulosa*, *Xylophasia monoglypha* (*polyodon*) and *Triphæna pronuba* took the place of *rumicis*, *rurea*, and *tenebrosa*. Occasionally *Noctua augur*, *N. C-nigrum*, *Miana strigilis* and *N. festiva* turned up. *Melanthia albicillata*, *M. ocellata*, *Thera variata* and *Macraria liturata* were common at rest in the woods. *Fidonia piniaria* was very common among the fir trees. and *Lobophora viretata* among the hollies. *Euthemonia russula*, *Chelonia plantaginis* and *Anarta myrtilli* were out among the heather and gorse, as also was *Eupithecia nanata.* My friend Mr. Abbott, of Wylde Green, took *Chærocampa porcellus*, and one or two *Thyatira derasa.* On Saturday last, he and I were on Cannock Chase, and found, between us, about 150 *Calocampa solidaginis*, from one of which I have obtained ova. Seven was the most found on one tree.—Harry M. Lee, 42, St. Paul's Close, Walsall. *August 28th*, 1890.

Wallasey.—I have this year taken the following rather local species on the Wallasey sandhills, Cheshire:—

April 4th. *Nyssia zonaria*, about eighty specimens; seventy being females. *May 1st.* *Eubolia lineolata* very abundantly. It was, however, taken as early as the end of March this year; a second brood emerges in July, and I took a specimen on the 28th of August; so we have had *lineolata* with us for over six months this year. *June 21st.* *Mamestra albicolon* and *Rhodaria sanguinalis.* *July 5th.* *Leucania littoralis* (I also took the larvæ of this species in the middle of April) and the larvæ of *Nyssia zonaria* feeding at dusk on various low plants. At the commencement of the present month (August) a friend of mine took seventeen *Agrotis præcox* on the hills. I was, unfortunately, away at the time, and so missed it. I went on the 29th in hope of getting the species, but when thunder, rain, and hail follow each other, one can hardly expect to take *præcox* or anything else.—A. E. Pike, Tranmere, Cheshire. *August 29th*, 1890.

Notes of the Season (Coleoptera).—*Hastings.*—Among others, I have taken the following species which may be worth recording:—

By sweeping, especially in the evening, *Colenis dentipes*, *Anisótoma calcarata*, *Colon brunneum*, *Athous difformis*, *Priobium castaneum*, *Anobium fulvicorne*, *Tychius 5-punctatus*, *Liosoma oblongulum*, *Ochina hederæ*, *Pogonocherus hispidus*, *Strangalia 4-fasciata*, *Lamprosoma concolor*, and *Cryptocephalus moræi.*

In a sandpit at Guestling I have found *Cænopsis fissirostris* (2), *C.*

waltoni (7), *Orobitis cyaneus*, *Cytilus varius*, *Pogonocherus dentatus*, and numbers of commoner species.

From ants' nests I have taken a few *Dinarda markelii*, several *Thiasophila angulata*, *Leptacinus formicetorum* (2), *Monotoma angusticollis*, *Myrmedonia humeralis*, *M. funesta*, *M. limbata*, *M. laticollis*, and flying round the nests in the sunshine were several *Clythra 4-punctata*.

In moss and tufts I found *Plinthus caliginosus* (3), and several *Tropiphorus carinatus*. Under bark, *Scaphidema æneum*, *Rhinosimus ruficollis*, *R. viridipennis*, *Thymalus limbatus* (1), together with numbers of common species such as *Dryocœtes villosus*, *Phlœophthorus rhododactylus*, *Rhyncolus cylindrirostris*, etc.

Under stones on the banks of one of the town reservoirs, *Tachys bistriatus* is very common. At Camber, in the banks of a stream, I have taken a few *Bledius crassicollis*, several *B. tricornis*, and about 150 *Heterocerus sericans*. Among river refuse I have on two occasions found *Octhebius rufomarginatus*, somewhat commonly, *Ocypus ater*, *Harpalus rotundicollis*, *Helophorus rugosus*, *Anthicus antherinus*, *A. instabilis*, and hosts of commoner species. On one occasion I beat a large number of *Dermestes undulatus* and *Corynetes violacea* out of the dry carcase of a dog, which I found on the beach.

On the sandhills, *Sarrotrium clavicorne* and *Helops pallidus* occasionally.

At the roots of grass on the cliffs I have taken *Trachyphlœus myrmicophilus*, *T. scaber*, *T. scabriculus* (common), *T. squamulatus* (occasionally), *Otiorhynchus raucus*, *O. ovatus*, *O. ligneus*, *O. scabrosus*, *O. sulcatus*, *Sitones humeralis*, *Syncalypta hirsuta*, *Simplocaria semistriata*, and many others.—A. FORD, Alexandra Villa, Braybrooke Road, Hastings. *July*, 1890.

EUBOLIA PERIBOLATA.—This pretty Geometer is unknown in England. It flies among furze bushes in the day-time, and is common in some seasons all around our coast. It appears in the perfect state in September, and the eggs are laid on the furze, the larvæ feeding on that plant. The larvæ being undescribed, I sent several to the late Mr. Edward Newman, F.L.S., who described them as follows in *The Entomologist*, vol. viii., p. 107 :—"The eggs were laid in a chip-box on the 18th of September, 1874, and the larvæ left the egg-shells during the first week in October; they fed in *Ulex europœus* (the common furze), almost exclusively on the blossoms, and after hybernation, continued to feed until the end of April, when they had attained their full size; two or three have already spun up between the folds of some muslin in the breeding cage; two of the larvæ are now before me, full fed, yet exhibiting no change of colour and no disposition to spin. The larva rests in a perfectly straight position, but on being touched, raises the anterior extremity, arching its back a little; its legs are then directed forwards, and closely appressed together, forming an almost continuous mass with the head. In crawling, it makes a very decided arch, bending the body nearly double. Head prone, slightly narrower than the second segment, in which it is partially received, it is sparingly beset with short straight hairs. Body robust, more resembling that of *Leucania* than that of a Geometer, a resemblance which is rather increased by its pale colour and longitudinal striping; every part of the body, but especially the anal extremity, bears short, straight, scattered hairs; a raised lateral skin fold extends the whole length of the body, and the segmental and sectional divisions are clearly defined. Head and body putty coloured; head with a few darker markings on each cheek, and five black ocelli on each side near the mouth; the dorsal surface of the body has three compound stripes extending its entire length; the medio-dorsal is divided longitudinally into three divisions, the middle one of which is composed of a series of wood brown markings, and these again are resolvable into mere dots; the lateral divisions are pale brown, bordered with a series of darker dots; the side stripes partake of the same triple character, and include the spiracles, which are circular and as black as jet; the ventral surface has a triple median stripe, the middle division of which is single, the external divisions double. I am indebted to Mr. W. A. Luff, of Guernsey, for a supply of these previously unknown larvæ."—W. A. Luff, Guernsey.

[There is no reason why this species should not occur on our own south and south-western coasts. Only two other species have been captured in the Channel Islands, which do not occur in Britain, viz., *Agrotis crassa* and *Polyphænis sericina.*—Ed.]

PRACTICAL HINTS.

By W. G. SHELDON.

(*a*) Beat birch at night. A large proportion of the larvæ now feeding on this tree are hard stickers, such as *Cerura bicuspis*, *Notodonta dictæoides* and *N. dromedarius*, or pass the day in spun up leaves, as *Cymatophora fluctuosa* and *C. duplaris*, *Drepanula falcula*, etc. All these will tumble into the tray readily at night when they feed.

(*b*) Search the umbels of *Angelica sylvestris* and *Pastinum sativa* for larvæ of *Eupithecia albipunctata* and *E. trisignata*, those of *Pimpinella saxifraga* for those of *E. pimpinellata* and *E. oblongata*, middle to end of September.

(*c*) Beat *Solidago virgaurea* (golden rod) middle to end of September for larvæ of *Eupithecia virgaureata*, and also in middle of October for those of *E. expallidata*.

(*d*) Gather seedheads of *Picris hieracioides* for larvæ of *Eupicœlia hybridellana*, also heads of wild carrot (*Daucus carota*) for larvæ of *Semasia rufillana*. Both these species should have old skins or rubbish to pupate in, and must be kept all winter in rain and sun.

(*e*) Examine heads of ragwort especially near the coast for a gregarious tortrix-like larvæ, if you can bring them through the winter you will breed *Homœosoma binævella*.—(J. W. T.)

(*f*) During September and October large numbers of *Depressariæ* and other species may be beaten from thatch, old stacks (hay, hop-bine, pea-haulm, etc.). In fact this method of work is more or less profitable *all the winter.*—(*J. W. T.*)

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*August 14th.*—The exhibits were as follows:—Mr. Wellman, *Emmelesia unifasciata*, bred from larvæ obtained at West Norwood in 1888, the species having been two years in the pupal stage; Mr. Adkin, *Cleora glabraria*, bred from New Forest larvæ; Mr. South, specimens of *Hypsipetes elutata* and *Larentia didymata*; Mr. Moore, two varieties of *Abraxas grossulariata*; Mr. Tugwell, larvæ of *Eupithecia extensaria* feeding on the common garden *Artemisia abrotanum*, these larvæ were obtained from specimens bred by Mr. Porritt from larvæ collected near Hunstanton last year; Mr. Tugwell, a box of *Arctia caia*; Mr. Hawes, living larvæ of *Argynnis selene* and *A. euphrosyne*; Mr. Jenner Weir, living larvæ of *Psyche villosella*, one case was formed entirely of rush, some with fragments of grass and heath, one made its case with coloured paper, the original case having been removed; Mr. Bouttell, a pale form of *Zygæna filipendulæ*; whilst Messrs. Turner and Nussey exhibited *Hesperia lineola*, Mr. Tugwell suggesting that the species was essentially a salt-marsh species.

August 28th.—This was essentially a holiday meeting, very few members being present. A few good exhibits were made, and might with propriety be exhibited again when more members are present. I refer more especially to Mr. C. Fenn's *Cidaria russata* and *Tortrix transitana*, the latter of which I should like to see compared with the series of this species in the collections of Messrs. West and Tugwell; Mr. Hawes, *Tapinostola concolor* from Huntingdonshire, taken in July this year; and Mr. Frohawk's var. of *Epinephele hyperanthus* with lanceolate markings taken in the New Forest. Mr. Carrington reported the capture of *E. hyperanthus* var. *arete* in the New Forest; Mr. Robinson exhibited some fine *Leucania brevilinea* and var. *sinelinea* from Norfolk; Mr. South, a box of Durham specimens which were very interesting; Mr. Fenn, a bleached *Epinephele janira*, *Leucania conigera* with the white spot strongly developed, and *Apamea ophiogramma* taken at Lee; Mr. Carpenter, specimens of *Pericallia syringaria* from Essex, and *Cucullia asteris* from Raindean Wood, Folkestone; Mr. Turner, *Myelophila cribrella* from Lee; Mr. Adkin, *Zygæna meliloti* from the New Forest, and remarked that the species appeared to have turned up in fair numbers in an entirely new locality; Mr. Waller, living larvæ of *Cuspidia leporina*; Mr. Joy, living larvæ and pupæ (spun up in *Festuca*) to show its habits. Mr. Carrington gave some account of a visit to Belgium, and pointed out what splendid collecting ground the sandhills presented, mentioning among other things, that he found several larvæ of *Argynnis lathonia* on *Viola*, and saw imagines of *Hesperia lineola*. Messrs. Fenn, Tutt, and Adkin made some remarks on the season before the meeting terminated.

September 11th.—Another holiday meeting, a very small proportion of the members being present. Mr. Wellman exhibited some good vars. of *Bryophila glandifera* and a long series of *Dianthœcia albimacula*, both from Folkestone, *Plusia festucæ* from Cambridge, and *Xanthia citrago* from Croydon; Mr. Adkin a series of *Emmelesia decolorata* from Co. Derry; Mr. Carpenter a series of *Argynnis paphia*, *A. aglaia*, *Limenitis sibylla*, and *Epinephele hyperanthus* from the New Forest; Mr. Fenn's exhibits, however, were, as usual, most interesting. They consisted of *Cidaria russata*, a second brood, with a remarkable tendency to follow the female form, *Tephrosia crepuscularia* from Clevedon and Perth, *Eupithecia satyrata*, var. *callunaria* and a remarkable form of *Scoparia ambigualis*, including one var. *curzoni*, from Darlington, the unicolorous var. *latiorana* of *Tortrix costana*, and a most interesting exhibit of *T. icterana*, the intermediate *T. teucriana* and *T. viburnana*, and suggested that all might be local forms of the same species; Mr. J. A. Cooper exhibited a fine series of an exceedingly suffused form of *Bryophila perla*, from Folkestone; Mr. Croker, a few specimens of *Ditula hartmanniana;* Mr. Robertson a larva of *Acherontia atropos;* Mr. Oldham, a number of species including *Hesperia lineola*; Mr. Cockerell, an American specimen of *Vanessa antiopa*, and stated that the American specimens were quite distinct from those of Europe, owing to the dark irrorated margin. A general discussion on *Carpocapsa pomonana*, its habits, foodplants, etc., with a sketch of its life-history by Mr. Fenn, closed a very quiet meeting.—Ed.

City of London Entomological and Natural History Society. —*August 21st.*—Mr. Bellamy exhibited a series of *Eulepia cribrum* captured at Bournemouth, August 4th to 7th. He had observed *Lycæna ægon* to be plentiful in that district, and had taken *Argynnis adippe* and *Limenitis sibylla* at Brockenhurst; also captured a single specimen of *Hesperia acteon* at Lulworth Cove. Mr. Burrows' exhibit consisted of *Epinephele hyperanthus* with very small eye-spots, a very light, almost buff specimen of *A. euphrosyne*, and a pair of *Boarmia roboraria*; the whole were taken in a wood near Coventry. Mr. Smith, *Cossus ligniperda*, which emerged on August 6th. Mr. J. A. Clark, bred specimens of *Dianthœcia conspersa* and *D. carpophaga* from North of Ireland; also series of *Agrotis lunigera* and *A. lucernea* from the Isle of Wight. Mr. Raine, preserved larvæ of *Saturnia carpini*, *Arctia mendica*, *Cuspidia psi*, *Pygæra bucephala.* Mr. Manley, fine living larvæ of *Sphinx ligustri*, being the third generation of a brood kept by him. Mr. Lusby, a series of *Vanessa io*, from Cheshunt, including one slaty variety; also a series of *Lycæna corydon.* Mr. Sampson, a series of *Triphæna fimbria* captured at Woodford. Coleoptera:—Mr. Boden exhibited *Clytus arietis*, *Toxotus meridianus*, *Dascillus cervinus*, etc.; and a small beetle, known to cultivators of the strawberry by the name of 'the Elephant' (probably so-called from the rostrum), which had been very destructive to certain beds in Kent and Surrey, on account of its propensity for eating the flower-stems of the plant when in full bloom. Its method of attack appeared to be to eat half-way through the stem, which in a short time caused the flower to droop, and fade. The beetle exhibited to the meeting was *Rhynchites betulæ*, a species commonly found on birch and also at hawthorn blossom.

Mr. Heasler's box contained many examples of Curculionidæ, and comprised *Hypera fasciculata*, *H. rumicis*, *H. polygoni*, *H. variabilis*, *Mecinus pyraster*, *Limobius mixtus*, *Poophagus sisymbrii*, *Phytobius leucogaster*, *Otiorhynchus atroapterus*, *Trachyphlœus scabriculus*, etc, Mr. Lewcock exhibited *Strangalia 4-fasciata* (captured on August 16th).

Cœliodes rubicundus, *Erirhinus pectoralis*, and *Rhynchites nanus*, the whole having been captured at West Wickham. Mr. Milton brought a quantity of insects which he had recently taken at Wicken Fen and the New Forest, the most noticeable being *Chrysomela graminis*, male and female specimens of *Agapanthia lineatocollis*, *Hoplia philanthus*, a lon series of *Serica brunnea* (partly taken at sugar), *Necrophorus ruspator*, *N. vespillo*, *Gastrophysa raphani*, several species of *Telephorus*, etc.; also a fine *Cercopis cornutus* (Homoptera), saw flies and many dragon flies.

Septembea 4th,—*Coleoptera*:—Mr. Beck exhibited New Forest species including *Leptura fulva*, *Geotrupes vernalis* from Swanage and the Lake District, also *G. pyrenæus*, *Licinus silphoides*, *Carabus nitens*, *C. arvensis*, *Achenium depressum* and *Rhagium bifasciatum*. Mr. Heasler, species from Deal, including *Syncalypta hirsuta*, *Psammodius sulcicollis*, *Corticaria Wollastoni*, *Silpha opaca*, *Corymbetes pectinicornis*, *Telephorus lividus* var. *dispar*. Mr. Milton, *Prionus coriarius*, *Silpha littoralis*, *Dorcus parallelopipedus*, and *Simodendron cylindricum*.

Lepidoptera:—Messrs. Raine and Simes, some well-preserved larvæ of *Notodonta dictæa*, *N. dromedarius*, *Cuspidia aceris*, *Platypteryx lacertula*, *Smerinthus tiliæ*, and *Metrocampa margaritata*. Dr. J, S. and Mr. S. R. Sequeira, a number of insects from the New Forest, including *Melitæa athalia*, *Zygæna trifolii*, *Z. meliloti*, a white-banded form of *Lobophora hexapterata*, *Eulepia cribrum*, *Boarmia repandata* var. *conversaria*, *B. roboraria*, *Mania maura*, *Cleora lichenaria*, *Diphthera orion*, a very dark *Eubolia palumbaria*; also fine larvæ of *Sphinx ligustri*. Mr Hanes, a series of *Phorodesma smaragdaria* from the Essex marshes and stated that at the present time he had larvæ of the same feeding in his garden at Kentish Town. The following members exhibited species of the genus *Agrotis*, to the discussion of which the evening was to be more especially devoted:—Messrs. Battley, Clark, Gurney, Hanes, Harper, Hodges, Hollis, Mera, Sequeira, Smith, and Tutt.

Mr. Battley having first drawn the attention of the members to the genus, Mr. Tutt gave a lengthy account of the superficial characters of the imagines, the apparent sub-divisions into which the genus might be divided, and the range of variation in the species, and made some remarks on the distribution, etc., of individual species in the genus. With regard to the superficial characters, he pointed out that there was first of all those species with hyaline hind-wings, joined by *A. segetum* and *A. lunigera* to the *tritici-cursoria* group, and that at the end of the genus were several species—*agathina*, *ravida*, *porphyrea*, *pyrophila*, and *candelarum* var. *ashworthii*—which seemed to have scarcely any affinities in common. The close connection of *Agrotis saucia* and *A. suffusa* was referred to, and the connection of these species by means of *A. segetum*, etc., to the next group. With regard to the superficial characters Mr. Tutt pointed out that sexual dimorphism was largely developed in many members of the group, but that whilst the ♂'s were generally pale and the ♀'s dark, pale ♀'s and dark ♂'s were by no means uncommon This was exceptionally well illustrated by *Agrotis puta* and *A. cinerea*, and almost equally so by *A. lunigera*, *A. segetum*, *A. corticea*, and *A. exclamationis*. The colour variation of *A. ripæ* with reference to environment was explained, and the difficulty of separating *A. tritici*, *A. cursoria*, and *A. obelisca* tackled. In Mr. Tutt's opinion these formed three distinct species, but *aquilina* he considered purely and simply a var. of *tritici*. The double line of variation:—(1) With a pale costa, (2) Without a pale costa, found in these species, was then fully explained, and the parallel range of variation was noted. Mr. Tutt pointed out that with the exception of Mr. Hodges and Mr. J. A. Clark, none of the members who exhibited *A. obelisca* had that species, but had vars. of *tritici* doing duty for it. *Helvetina* being in our lists was an absolute error, due to Dr. Knaggs, the species never having been taken in Britain. The uncertain appearance of *saucia*, the gradual increase both in number of localities and number of captures of *pyrophila* and *agathina* were noted, and the excessive rarity in late years of *ravida*. The determination of *ashworthii* as a variety of *candelarum* was also remarked. These remarks were illustrated by the exhibits of members, the drawers of Messrs. A. J. Hodges and J. A. Clark being especially good, whilst Mr. Tutt exhibited the picked vars. from his own collection. A miscellaneous discussion followed, which showed that the members were in perfect accordance with Mr. Tutt's ideas on the subject.

It was arranged that October 16th should be a special *Tæniocampa* night,[1] when Mr. Tutt has promised to give an outline of the genus and its near allies, and exhibit the whole of his long series of the species in this genus. It was also arranged that another night should be devoted to the study of the AGROTIDÆ in the course of a few months.—G. A. LEWCOCK and E. HANES, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON.—*September* 3rd.—Mr. C. Fenn exhibited and remarked on specimens of *Eupithecia satyrata*, *Eudorea ambigualis*, and *Tortrix viburnana* from Darlington. Mr. H. Goss exhibited, on behalf of Mr. Martin Stanger Higgs, a remarkable variety of *Melitæa aurinia* (*artemis*), taken a few years ago in Gloucestershire by Mr. Joseph Merrin. The Rev. Dr. Walker communicated some observations on the Entomology of Iceland, and gave an account of his recent travels in that island. He stated that he had taken *Bombus terrestris* this year, for the first time, in the north-west of Iceland from which quarter of the island it had not been recorded by Dr. Staudinger; he also referred to the enormous numbers of Ichneumonidæ and Diptera which he had noticed in the island. He further stated that in 1889, in the months of June and July, *Noctua conflua* was the most abundant species of Lepidoptera in Iceland; but that this year, in July and August, *Crymodes exulis* was the prevailing species, and that *Charæas graminis* and *Coremia munitata* also occurred in great numbers. In reply to a question by Mr. Stainton, Dr. Walker said that the flowers chiefly frequented by the humble-bees were those of a small species of white Galium (probably *Galium saxatile?*) and *Viola tricolor*. Dr. Walker also read "Notes on *Calathus melanocephalus* collected in Iceland, the Westmannö Isles, and the Faroe Isles in June and July, 1890." Messrs. M'Lachlan, Stainton, Jenner Weir, Stevens, Jacoby, Lewis, and others took part in the discussion which ensued. Mr. Arthur G. Butler communicated a paper entitled "Further Notes on the Synonymy of the genera of Noctuites."—H. GOSS, *Hon. Sec.*

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[1] The Secretaries would be very pleased if lepidopterists would exhibit any striking specimens of this group on the evening of Oct. 16th.—ED.

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(Continued from page 125.)

I have heard it suggested against this theory, that the insects from marshes and similar situations are pale coloured, and, as instance, the Leucanidæ have been given, on the assumption, I presume, that all insects from such localities should be dark, but this does not appear to me to militate in any way against the theory. I, fortunately, have been able to study the actual habits of some of the species of this family in a state of nature, and, as they sit head downwards, with their wings folded closely to the edges of the reed on which they usually rest, the appearance they have so closely resembles the nodes in a reed culm, that it is hardly possible for a trained eye to detect them, and we may be certain that the peculiar colour, which is so advantageous in enabling them to escape their enemies and thus perpetuate their species, is as directly dependent on " natural selection," as is the darker assimilating colour of those species which rest on the ground, fences, or other dark objects. As well say, because some particular genera of marsh frequenting moths are pale, that all should be pale, as, that because some Rannoch species are white, all should be white. An argument of this kind would be ridiculous until we know the particular habits of each species. But with regard to the pale, marsh-frequenting genera, I have specimens which prove distinctly that even these species vary according to general humidity coupled with an area in which large quantities of smoke are being produced, *e.g.*, *Leucania impura* and *L. pallens* produce much darker specimens in the London marshes than in the open fields near Strood, in Kent, and Scotch specimens are occasionally darker still. Again, *Agrotis nigricans* is blacker from the Greenwich marshes than from the fields and marshes in the neighbourhood of Rochester, where they are generally much marbled with yellow, and the same (Greenwich) marshes give a much larger percentage of dark specimens than any locality I know of a drier character. *Apamea fibrosa* has a larger percentage of pale variegated forms in its more open localities. Many examples of this kind could easily be adduced in the same direction. But it must be remembered that the Fen District of England is probably the *driest* part of the British Isles, so far as actual rainfall is concerned, and this must be carefully borne in mind when considering the species obtained in this district, or those of a similar environment.

Another query based on the same line of argument is occasionally heard. "Why do we get white butterflies and black moths on the same geological strata ?" Such a question always appears to me to show entire ignorance of the subject of "natural selection." The colours of butterflies assimilate generally to the flowers or other objects on which they rest. Their wings are drawn up over their bodies when at rest, and we only see the undersides. It is, therefore, to the undersides we must especially look for variation, and here we chiefly find it. The variation of the undersides of our most common butterflies is a most interesting study, and opens up a wide field to those who have never looked for variation, where, in this group, variation must show itself. Of course the variation of butterflies on the underside is often reproduced in a mild form on the upper side, but from a scientific point of view, the variation of the upper sides is practically valueless, compared with the variation of their undersides. Incidental cases of variation occasionally occur on the upper side of butterflies, but as a general rule such varieties are, in my opinion, constitutional, and each must be considered on its merits as to its probable mode of causation.

These undersides, serving as they do for a protection to the insect, must be studied then, if we are to find the changes which "natural selection" plays in this group. As an example of the influence of environment on a butterfly, I will instance *Pieris napi.* In our southern districts of England it is generally very clear (although showing seasonal variation within certain limits), white on the upper, and yellow or greenish grey on the under surface. In many Scotch and Irish localities it is normally much darker and more suffused, and on the Alps the spring form—var. *bryoniæ*—is very dark. But in the South of England, *Pieris napi* settles on leaves, where its yellow or greenish underside protects it to a great extent; while in the Alps, the extreme form frequently settles on the bare ground, or on vegetation more or less blackened by cold and exposure, where its darker coloration is now particularly protective. The undersides of *Vanessidæ* bear great resemblance to dead leaves, the yellow and greenish undersides of *Pieridæ* to green leaves; the speckled undersides of *Lycenidæ* to the inflorescence of grasses, and, indeed, it could easily be proved that every particular species has its undersides particularly developed to suit its surroundings, *e.g.*, *Euchlöe cardamines*, *Hipparchia semele*, and *Thecla rubi*, are striking examples. I think I have shown that all our butterflies (for purposes of variation) should be studied from their undersides, and have cited enough examples to show that white or other coloured butterflies will continue to exist side by side with dark moths, and that such facts are not at variance with the theory advanced. Geometers which rest in the same position as butterflies will also have to be studied from the same standpoint. The genus *Selenia* occurs to me at the present moment.

Again, a thoughtful lepidopterist says:—"If your theory be true, then the same effect ought to produce the same result. Take for example *Polia chi!* Why in Durham are the dark specimens of *chi* always inclined to var. *olivacea*, while the dark var. in Yorkshire is so different?" The reason is not far to seek, but our lepidopterists must bear in mind that we have two[1] strong causes at work:—(1). The exciting cause in the production of melanism, which I assume is moisture; (2). The general protective influence of "natural selection." The same cause (moisture) does produce the same effect, viz., the darkening of the ground colour, but the second influence of environment, governed by "natural selection," plays a still stronger part, and I would again ask my readers to bear in mind that, if anything in the environment tends to the protection of a certain form, that form will be produced to the almost entire exclusion of all others, and a permanent local form will be established. In *Polia chi* these forces are undoubtedly at work, and, until my readers will master the fact that any secondary influence may modify, or almost entirely obliterate the original effect, very little can be done towards the mastery of this subject.

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[1] I would ask all my readers who pay attention to this subject, not to form hasty opinions where their observations do not appear to coincide with my conclusions, but to take into account all the surrounding circumstances, and above all to have plenty of material for comparison. It is useless to form an opinion on the difference between a few (say less than a score or so) specimens from different localities, and equally useless to compare specimens from comparatively adjacent districts, *e.g.*, Lancashire and North Wales, and expect a striking difference. Often there will be, but more often there will not. *Aplecta nebulosa* from Glasgow is occasionally of a beautiful white colour, altogether different from our South of England specimens. Following out my theory the Glasgow specimens should be darker, but some outside force undoubtedly modifies the species in this district, with the result that it differs in the way I have pointed out. I do not doubt that if I saw this insect *in naturâ* at Glasgow, I could easily explain this apparent opposition to my theory, but I know nothing about its environment there.—J.W.T.

(*To be continued.*)

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Miana arcuosa v. *morrisii* C. W. Dale (=*Acosmetia morrisii*), *Ent. Rec.*, 34.

Cuspidia aceris Lewcock and Hanes (=*Acronycta*[1] *aceris*). *Ent. Rec.*, 167.

Retinia margarotana H.-S., C. G. Barrett. *Ent. Mo. Mag.*, Feb., 49. Scotland.

Doryphora elongella Hein. [*Doryphorella elongella*], C. G. Barrett. *Ent. Soc. Lond.*, April 2.

Gelechia portlandicella n. sp. Richardson. *Ent. Mo. Mag.*, Feb., 29. Portland.

Tinagma betulæ n. sp. Stainton, *Ent. Mo. Mag.*, Oct., 264 (imago). J. H. Wood, *Ent. Mo. Mag.*, Oct., 261–264 (life history).

Prof. J. B. Smith has published (1890) a bulky revision of the North American moths formerly referred to the genus *Agrotis* (*Bull. U. S. Nat. Mus.*, No. 38). The generic nomenclature is considerably revised, and although the work relates only to American species it is of importance in relation to the British fauna, several of our species being found in the United States.

Prof. Smith adopts the genus *Peridroma* Hbn. for *Agrotis saucia* and other species.

In *Canad. Entom.*, Sept., 173–175, the present writer suggests the use of plural section names for groups of species which do not seem well separated as genera or subgenera, and yet show affinities which ought not to be overlooked. Of the names proposed, *Antiopæ* includes our *Vanessa antiopa*, *Rustici* includes *Lycæna ægon*, and *Chrysophanuli* is the section of *Chrysophanus phlœas.* Prof. J. B. Smith, in his *Revision of some Tæniocampid genera* (1889), divides the North American species of *Tæniocampa* into groups in a similar way, but his section names are simply those of the most prominent species, not made plural; and one cannot help thinking that the use of them in the unaltered form for groups as well as species might lead to confusion.

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[1] Grote, in his recent (1890) Check-List of North American Noctuidæ divides *Acronycta* into ten subgenera.

[ERRATUM.—Page 121, line 30, delete *Doryphora obscurella* Hein. —T. D. A. C.]

COLEOPTERA.

Chrysomela rutilans Woll. Billups, *South London Ent. Soc.* vide *Young Nat.*, 170. Boro' Market (an accidental introduction).

Cetonia floricola v. *albiguttata* Andersch. Gemm. and Har., *Cat. Coleop.*, p. 1324. "Anglia."

Coccinella hieroglyphica v. *lineolata* Marsh, Gemm and Har., *Cat. Coleop.*, p. 3751. "Anglia."

Adalia bipunctata [*Coccinella bipunctata*] v. *7-pustulata* Marsh. Gemm. and Har., *Cat. Coleop.*, p. 3746. "Anglia."

The last three from Gemm. and Har. are of course not new records, but they are omitted from the 1883 lists of Dr. Sharp and Messrs. Fowler and Matthews. The British lists are far from being complete as to the named varieties of Coleoptera.

HEMIPTERA.

Anthocoris confusus Reut., J. Edwards, *Ent. Mo. Mag.*, 236.

PSEUDONEUROPTERA.

The "Editor of the *Naturalist's Gazette*" [who is W. H. Bath, though it is not so stated] has recently published a little book called an *Illustrated Handbook of British Dragon-flies* (1890, p. 98) in which the following apparently new varieties are described:—

Platetrum depressum v. *hageni*, *Libellula quadrimaculata* v. *immaculata* and v. *selysi*, *L. fulva* v. *fasciata* and v. *fugax*, *Orthetrum cærulescens* v. *donovani*, *stephensi*, *evansi* and *leachi*, *O. cancellatum* v. *croydonensis* and *vesta*, *Sympetrum vulgatum* v. *anglica*, *Cordulia ænea* v. *charpenteri* and *harrisi* (and a v. *hampsteadensis* is mentioned, but not described), *Cordulegaster annulatus* v. *minor*, *Anax formosus* v. *lindeni*, *Calopteryx virgo* v. *ramburi*, *eversmanni* and *mülleri*, *Agrion elegans* v. *newmani*, *Pyrrhosoma minium* v. *hansemanni*. Probably other students of the order will have something to say about this work. We notice that Mr. Kirby's generic nomenclature of the *Agrion* group is not adopted. Eight varieties, besides the above, are given, but they were originally described by Newman, Stephens, Curtis, and Leach. *Micronympha elegans* v. *rufescens* (Leach), a variety recently taken by the present writer near Leigh, in Essex, is not included.

Elipsocus consimilis n. sp. McLachlan. *Ent. Mo. Mag.*, Oct., 269 near Bournemouth and in Suffolk.

Peripsocus parvulus Kolbe, McLachlan, l.c., New Forest.

—T. D. A. C.

SCIENTIFIC NOTES.

PROBABLE PARTHENOGENESIS IN ARCTIA MENDICA.—In May this year I found a fine fresh ♀ *mendica*, just emerging[1] from the pupa, and as I wanted some ♂'s I kept her and tried "assembling" the next evening. This, however, was not successful, though I persisted for several nights exposing her (in a "cage") in a likely locality. As she was not a first-rate specimen after this, I did not kill her, and she laid a number of eggs in the box in which she was kept. Not knowing that some might be fertile and others not, I put the box aside on noticing that some of the eggs were shrivelled up; but on opening it to-day I found about fifteen had produced larvæ, which were lying at the bottom of the box dead. Now it occurs to me:—(1). Would those larvæ have produced imagines as if the ova had been properly fertilised (which I am sure they were not)? (2). Would the imagines, in the case of any being produced, have been ♂ and ♀ as usual, or only of one sex? (3). Would they have been capable of being fertilised *inter se* or by other specimens, or would they have inherited the parthenogenetic faculty?—E. W. BOWELL, Hereford. *July 18th*, 1890.

ANEURISM IN NYSSIA HISPIDARIA.—I have noticed a very frequent occurrence of saccular distension in *Nyssia hispidaria*. To prevent the wings adhering to the setting board when the sacs discharge, I pin upon each slope of the board a strip of thick white blotting paper and use braces of the same material. The result, in every case, is thoroughly satisfactory.—J. ARKLE, Chester.

ANEURISM IN EPUNDA LICHENEA.—I have just noticed this peculiarity in *E. lichenea* which I have been breeding from pupæ given me by Lieut. Brown.—J. W. TUTT. *October 8th*, 1890.

ZYGÆNA LONICERÆ IMAGO WITH HEAD OF LARVA.—Whilst breeding a number of *Z. loniceræ* this summer, from pupæ collected near Mansfield, Notts, by Mr. Daws, two imagines emerged with the heads of the larvæ still unchanged. I noticed that in the *Report of the Guernsey Society of Natural Science* (1889), p. 158, the same form of monstrosity is noted as occurring in *Zygæna trifolii*.—J. W. TUTT, Westcombe Hill. *August*, 1890.

SATURNIA CARPINI COCOON WITH TWO EXITS.—In August last I took about thirty larvæ of *Saturnia carpini*, in Wicken Fen, feeding upon meadow-sweet. I fed them up upon sloe, and twenty-three turned out satisfactorily. The colouring of the cocoons is peculiar, ranging from a transparent-looking white to a brick-red tint, the former predominating. Three larvæ taken last year on the Fen made cocoons of the same white colour (one was shown at the City of London Society early this year). One of my cocoons, a large white one, has two exits, and appears to contain one healthy pupa. I should like to know whether the white-coloured cocoons are obtained in any other locality. —MILLAIS CULPIN, 7 Warwick Terrace, Hoe Street, Walthamstow. *September*, 1890.

[I have in my collection a normally coloured one with two exits, which contained one pupa, the moth from which died in the act of emergence, being wedged in one exit, presumably, too small to admit of its passage.—ED.]

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[1] It is a well known fact that the males of certain species will copulate with the females directly emergence takes place. If this insect had emerged in a state of nature, there is the probability of immediate copulation having taken place.—ED.

LARVÆ IN A COMMON COCOON.—Thinking one of my *Eriogaster lanestris* cocoons unusually large, I opened it and found two pupæ squeezed together. One had suffered more than the other, but both were pushed out of shape. The cocoon itself was perfectly formed, and there was no partition between the pupæ. They had been sleeved out in a large bag with only a dozen neighbours.—G. M. A. HEWETT, Winchester. *September*, 1890. [This is a most unusual structure, I have never seen anything like it before.—ED.]

CURRENT NOTES.

A paper, by Herr Fritz Rühl, on the differentiation of *Melitæa athalia*, *parthenie*, and *aurelia*, is being published in the *Societas Entomologica* (1890).

Our Micro-lepidopterists should be interested in a paper, by Herr C. Schmidt, on the "Larvæ and Cases of the COLEOPHORIDÆ found in Silesia," published in the *Societas Entomologica* (1889), pp. 169 and 184; (1890), pp. 3, 12, 19, 44.

Mr. C. W. Dale, F.E.S., who is writing a "History of the Sphinges" in the *Young Naturalist*, has placed together the whole of our five-spotted Burnets (*meliloti*, *trifolii*, and *lonicerœ*) under the name of *loti*. Some of his statements and conclusions are startling, and appear altogether unsupported by facts.

Besides the two specimens of *Plusia moneta* already noted in the *Record* (that in the "Current Notes" for last month being captured by Mr. Holland), a third was taken at Dover by a school-boy, hovering over a *Delphinium* blossom, and is now in Mr. Webb's collection, whilst a fourth has been captured by Mr. R. A. Dallas Beeching near Tunbridge Wells.

Mr. N. M. Richardson, B.A., has recorded (*Ent. Mo. Mag.*) another specimen of *Epischnia bankesiella* from Portland. Of the five specimens which have been captured, Mrs. Richardson has taken three, and Mr. Richardson two. Mr. Richardson also records the capture, in Dorset, of specimens of *Steganoptycha subsequana* in a fir wood, and *Mixodia rufimitrana* amongst silver-fir, in the terminal shoots of which the larvæ probably feed.

Dr. J. H. Wood has found a new *Tinagma*, of which he describes the life history in the *Ent. Mo. Mag.* (October). The larva first lives in the twig, enters the leaf by passing up the stalk, and cuts out its case from the leaf. There is a thickening for about two inches at the end of the shoot, and the larvæ are best collected before entering the leaf, as they only enter it at night-time, and remain only long enough to cut out their cases. The species is described and named *betulæ* by Mr. H. T. Stainton, F.R.S., etc.

Mr. E. Meyrick records (*Ent. Mo. Mag.*) *Aplota palpella* from Ramsbury, Wilts, captured in August.

It is with great regret that I have to record the death of two well-known British entomologists, Mr. C. Hall, of Dover, and Mr. Owen Wilson, of Caermarthen.

VARIATION.

Var. of Smerinthus tiliæ.—I bred a fine female *S. tiliæ* to-day, with black hind wings. J. A. Clark. *June 5th*, 1890.

Sexual Variation in Euchelia jacobææ.—I do not remember having seen it remarked that there is a distinct difference in the colour, or shade of colour, of the males and females of *Euchelia jacobææ*. It is well known that, contrary to what is usually the case, the males of this moth are considerably larger than the females; but this is not the sole distinction. The moth, generally abundant, has this year been more than ordinarily so, and, sorting out a long series, I was struck with the difference of colour between the sexes. The fore-wings in both sexes have the brilliant carmine identical. In the females the hind-wings are of the same bright colour; but the hind-wings of the males are much lighter—in fact, are not carmine, but crimson. The moths first made their appearance this year in the latter half of May, and are to be taken now in the middle of July. A good instance of protective resemblance afforded by this moth was noticed by Mr. Dover Edgell at Bognor. A specimen at rest on a dark red brick wall assimilated in tints so wonderfully to its surroundings as to be barely perceptible. My largest male measures exactly 1¾ in., my smallest female 1¼ in. A large number of the larvæ were collected and bred by Mr. Edgell in the hope of obtaining a yellow variety; but they were all of the normal colours. I saw some years since a remarkable variety in the cabinet of Mr. Cabris of Ringwood, in which the hind-wings were of the same smoky colour as the ground colour of the fore-wings, being destitute of carmine or crimson altogether.—Joseph Anderson, Jun., Chichester.

Small Variety of Euchlöe cardamines.—In reply to Mr. A. E. Hall (*Ent. Record*, p. 98), I may say that I have a male specimen of *E. cardamines*, which I took here a few years ago, measuring one inch and three-eighths from tip to tip, very little larger than his. My largest male is nearly two inches.—Id. *July*, 1890.

Small Varieties of Smerinthus populi.—I possess two males of this species which, I believe to be unusually small. One measures exactly two inches and an eighth from tip to tip, while the other is scarcely a quarter of an inch larger. They were both bred from larvæ in 1888.—J. H. D. Beales, Arthur House, Margate. *July*, 1890.

[These small vars. are generally produced by insufficient or innutritious food.—Ed.]

Local Forms of Cœnonympha davus.—*Cœnonympha davus* from Manchester mosses are dark, darker than Hartford specimens I have, and apparently darker than the typical *C. davus* at Kirkby.—J. Collins, Warrington. *August 13th*, 1890.

Smerinthus tiliæ var.—I have this year bred a variety of *S. tiliæ*, in which all the wings are of a beautiful fawn colour similar to the ground colour of the normal type, but much brighter, the hind wings being especially so. The green tint is scarcely visible, and even the dark central band of the fore wings is suffused with the red tinge. Thorax and body are of the same colour. This specimen was bred *from a pupa* found *under the bark* of elm. Last year I bred a variety in which the central band is reduced to a small spot.—J. H. D. BEALES, Arthur House, Margate. *July 25th*, 1890.

MELANTHIA OCELLATA VAR.—On June 5th, I captured at Wimbledon, a var. of *Melanthia ocellata*, in which the transverse median band is almost obliterated, the normal inner edge of the band being indicated by a smoky line.—F. J. BUCKELL. *July 29th*, 1890.

YELLOW VAR. OF TORTRIX VIRIDANA.—I captured a yellow variety of *Tortrix viridana*. I see Wilkinson mentions a primrose var. of *viridana*, always female, mine is female.—T. A. CHAPMAN, Hereford.

LOCAL FORM OF ABRAXAS ULMATA.—The form of *A. ulmata*, which I have captured near Chatham (*ante* p. 109) is very unlike that which, in 1828, I captured about two miles from Bewdley in Worcestershire. The Chatham specimens vary in the following way: They are smaller; the ground colour of the anterior wings more silvery white, and there are fewer clouds; the fringes of the hind wings also silvery white and not bordered with brown. I understand the same form occurs near Woolwich; but a Worcester correspondent says that only the large form exists in the Museum there. It is strange that the localities where I have captured the large form have always been near fresh water, and those where I have captured the small near salt water. Can there be any connection?—J. TYRER, Jeffery Street, New Brompton, Kent. *August*, 1890.

[I do not see that any connection exists between the forms of the species captured and the different localities, as far as the influence of salt and fresh water is concerned. In Durham, specimens of extreme size (large and small) occur in abundance in the same locality, and with every apparent extreme in the quantity and depth of coloration of the clouded markings. My specimens from the Midlands are all comparatively large, and those from Kent all comparatively small, but perhaps this is more apparent than real owing to insufficient material for comparison.—ED.]

MELANIPPE FLUCTUATA var. NEAPOLISATA.—*M. fluctuata* varies somewhat on the Continent, but not so much as in Britain. The variety was named and figured by Millière. When sending me Millière's extract, Professor Blachier wrote:—"Millière has found in and near Naples, this obscure variety of *fluctuata*. Finding it interesting, he figured the ♂ in the *Iconographie*, vol. iii., pl. 131. Last year, I gave him one of the two females which you had sent to me in October, 1886, and it is this female that he has figured in the *Annales de la Société Entomologique de France*, 1887, pl. v., fig. 7. *Cidaria fluctuata* varies much. It is necessary, however, to consider as the type those specimens, of which the colour of the wings is of a whitish grey, with three black spots on the upper wings; the first at the base of the wings, the second as large, placed on the costa, the third small, also on the costa. Var. *neapolisata* is distinguished from the type by the darker colour of all four wings, which are sometimes of a blackish brown, sometimes of a smoky yellowish brown. In the upper wings, the second spot is continued almost to the inner margin in the form of a more or less complete band." The species has been found in several localities besides Aberdeen, among others, Glasgow, London, Clevedon (Somerset), Bournemouth, York, etc., and would undoubtedly be found in many others if specially looked for.—W. REID, Pitcaple, Aberdeen, N.B. *June 13th*, 1890.

VARIATION IN MELANIPPE FLUCTUATA.—I notice two distinct types of variation in *Melanippe fluctuata*, which is a very common moth in this district, especially in the months of April and May. In the type which I will call No. 1, the dark bars are very distinct and go right across the wings, they are very black and show up most conspicuously on the light ground, which appears white by contrast. In No. 2 type, the dark markings are much less distinct, and stop in the middle of the wing. I have an extreme case of this type in which the bars are absent, the only trace of them being two oval spots on the upper margin of each wing, with dark edges and lighter centres. I find No. 2 much the commoner type here, and the specimens are larger than No. 1.—JOHN WILLIAMS VAUGHAN, JUN., The Skreen, Erwood, R.S.O., Radnorshire.

BLACK VAR. OF LIMENITIS SIBYLLA.—On Friday, July 18th, I captured at Holmesley a fine specimen of the black variety of *Limenitis sibylla*.—R. E. JAMES, Hornsey, N.

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON (LEPIDOPTERA).—*Pitcaple.*—Several *Noctua sobrina* have been obtained in Aberdeenshire this year. *Agrotis pyrophila* has also been captured, and *Stilbia anomola* in fair numbers. Sugar and flowers produced splendid results last month, and I should pronounce the last half of July and first half of August all that any one could desire, from an entomological point of view, the only drawback being the rain. Sometimes insects literally swarmed on the flowers during the rain, a thing I never noticed before.—W. REID, Pitcaple, Aberdeen. *August 27th*, 1890.

Sligo.—Insects seem to be tolerably abundant here this season. Each year some one species seems to be more abundant than usual. This has been a year for *Chærocampa porcellus*; the flowers of the common rocket proved very attractive to them as well as to *Dianthœcia* and *Plusiidæ*. Sugar has, however, been a complete failure, hardly anything having been obtained at it except *Xylophasia monoglypha*, and of this species very few of the dark vars. have been captured. Light, on the other hand, has been very attractive. On the night of August 8th, between 11.30 p.m. and 1.30 a.m., I captured 147 specimens and 42 different species. My mode of working is simply a duplex lamp placed at a window; a tap tells me of an arrival, and I go outside and bottle the insect, if worth while. On this night, however, I had to stay outside, and was unable to bottle one quarter of those that came. The night was tolerably dark, with a south wind blowing in light squalls. —P. RUSS, Culleenamore, Sligo. *August 26th*, 1890.

Wye Valley (*below Builth*).—I think that in our district this year has, on the whole, been a bad one for lepidoptera up to the present time. Butterflies have been very scarce, even the commonest sorts being much fewer in numbers than they generally are. I took a few specimens of *Lycæna argiolus*, but not so many as last season. I tried the sallows on several nights but did very badly, only taking *Tæniocampa stabilis*, *T. instabilis*, *T. gothica*, *T. cruda* and *T. munda*. I failed to get a single *T. rubricosa* or *T. leucographa*, both of which I obtained last year. During the latter end of May and all through June, I used a light on every suitable night, and also did a good deal of beating and hunting posts and tree-trunks. I succeeded in taking the following insects:—*Chærocampa elpenor*, *Lithosia rubricollis*, *Arctia menthastri*, *A. lubricipeda*, *A. fuliginosa*, *Notodonta trepida*, *Nudaria mundana* and *Nola cristulalis*. I also took the following Geometers:—*Melanippe fluctuata*, *M. montanata*, *M. tristata*, *Hemerophila abruptaria*, *Anticlea derivata*, *Panagra petraria*, *Tephrosia crepuscularia*, *Rumia cratægata*, *Anaitis plagiata*, *Coremia ferrugata*, *C. unidentata*, *Odontoptera bidentata*, *Selenia illunaria*, *Abraxas ulmata*, *Iodis lactearia*, *Asthena luteata*, *A. candidata*, *Cabera exanthemaria*, *Numeria pulveraria*, *Melanthia ocellata*, *Cleora lichenaria*, *Camptogramma bilineata*, *Larentia olivata*, *L. pectinitaria*, *Boarmia repandata*, *Lomaspilis marginata*, *Emmelesia decolorata*, *E. albulata*, *Metrocampa margaritaria*. Among the Noctuæ, I captured *Hadena thalassina*, *H. dentina*, *H. genistæ*, *Xylophasia rurea*, *X. lithoxylea*, *X. polyodon*, *Noctua brunnea*, *Abrostola triplasia*, *A. urticæ*, *Plusia chrysitis*, *P. iota*, *P. gamma*, *Triphæna pronuba*, *Acronycta* (*Cuspidia*) *psi*, *A.* (*Viminia*) *rumicis*, *Agrotis exclamationis*, *Grammesia trilinea*, *Hecatera serena*, and *Leucania comma*. I noticed that the *Hadenas*, especially *dentina*, were very plentiful. I took several specimens of *H. genistæ*, which is anything but common here. I took them sitting on the posts of the railway fence, and, curiously enough, I have always taken them in the same field.—JOHN WILLIAMS VAUGHAN, JUN., The Skreen, Radnorshire.

Hailsham and Eastbourne.—I have been spending a fortnight at Hailsham, arriving there on the evening of Monday, June 9th, in company with the Rev. C. F. Thornewill. With regard to our captures, Geometers were very scarce and sugar a failure, one *Dipthera orion* being the only thing worth having that we took at it. On the other hand *Melitæa athalia* was abundant, and it may be worth remarking that we obtained a good many specimens of it, by searching the stems of the grass along the rides with our lamps, whilst waiting to look over the sugar. Our captures included, besides the species mentioned, *Eupithecia plumbeolata*, *Argynnis selene*, *A. euphrosyne*, *Zygæna trifolii*, *Procris statices*, *Tanagra chærophyllata*, *Herminia barbalis*, *Tephrosia extersaria* (very scarce), *Chelonia plantaginis*, *C. villica*, *Cidaria russata* (some nice varieties), *Eurymene dolabraria* (two or three), *Metrocampa margaritaria*, *Venilia maculata* and a few common NOCTUÆ. At Eastbourne, we took *Lycæna adonis*, *L. alexis*, *Melanippe rivata*, *M. galiata*, *Crambus chrysonuchellus* and *Acidalia subsericeata*, this latter species occurred also at Hailsham.—E. C. DOBRÉE FOX, Castle Moreton Vicarage, Tewkesbury. *August 5th*, 1890.

Durham.—The weather here for the last three weeks has been extremely bad, the days chill and sunless with much rain, and the nights cold and windy (generally N.E.). On the few occasions on which I have attempted sugar and light, both have proved entirely unproductive. The 9th was a finer day than usual, and a friend and I went to the coast to try for *L. salmacis.* The day was windy with occasional intervals of bright sun, and, after several hours' hard work, we succeeded in taking 23 specimens. They were scarce but in good unworn condition, and one of them, which I was fortunate enough to take, was a fine underside variety, the undersides of all the wings being a curious smoky black, with the spots almost obscured. I also took a beautiful ♀ var. of *L. alexis.* My friend took a solitary specimen of *Procris geryon* in fine condition (is not this extremely late for it ?), and we also took two dozen Geometers of various kinds, so that altogether we were well satisfied with the day's work. I have recently bred two vars. of *Arctia caja*, one much darker and the other lighter than usual, so that they form a nice contrast, also two vars. of *A. villica.*—T. MADDISON, South Bailey, Durham. *July 12th*, 1890.

Newbury.—Although at present this season has been wet and dull, I have found it much better than that of 1889. Sugar seems extremely uncertain. At Marlborough, up to the time I left (June 28th), luck was good, night after night the sugared trees had from eight to ten insects on each of them; among others being *Leucania turca*, *Euplexia lucipara*, *Hadena pisi*, *H. thalassina*, *H. chenopodii*, *H. adusta*, *Aplecta herbida*, *Xylophasia hepatica* and *Neuria saponariæ.* Since I returned home, I have sugared repeatedly where in 1888 I took some remarkably good NOCTUÆ and in great numbers, but the results have been very discouraging. For four nights I saw nothing worth taking, most of the patches having not a single moth upon them. Last week, I tried a fresh hunting ground, and took 20 fine specimens of *Leucania turca* in one evening. With the exception of one *Thyatira derasa*, one *Noctua triangulum*, and an occasional *Tryphæna pronuba*, nothing else was attracted by the artificial sweets. A quantity of grass is still uncut in the neighbourhood, and I fancy this may account in part for the failure of the sugar. Light has proved very successful. On July 8th, I took no less than 50 specimens in my moth trap, all in good condition, and among them such species as *Emmelesia alchemillata*, *Eupithecia subnotata*, *Acidalia subsericeata*, *Cidaria dotata*, *Pericallia syringaria*, *Crambus perlellus*, *Xanthosetia zoegana*, *Smerinthus populi*, *Timandra amataria*, *Dipterygia pinastri*, *Acidalia scutulata* and *Hadena dentina.* The larvæ of DIANTHŒCIÆ seem remarkably plentiful this season. Yesterday, I collected a great number in the capsules of *Silene inflata*, and among these are what I believe to be *E. affinitata* larvæ. Last year I spent much time in Pen Wood near here, searching the flowers of foxgloves for the larvæ of *E. pulchellata.* I hunted only among the flowers growing thickly together inside the wood. This year Mrs. Bazett, who was here for a day or two's collecting, found some larvæ on a solitary flower growing in an open space of the same wood. After this discovery, we found a great number in a short time, but all from solitary flowerheads in the open spaces of the wood. Can any lepidopterist give me a few hints as to the treatment of *E. pulchellata* larvæ during the winter? I should also be most grateful if anyone could instruct me as to a method for bringing through *Amphydasis prodomaria.* For the last three winters I have been most unsuccessful with this species. Most of my larvæ have "gone down," a fine batch of *Hadena genistæ*, is my most interesting family just now, they are feeding up ravenously on chickweed. I hope to be able to bring them out this autumn.—M. KIMBER, Newbury. *July 17th*, 1890.

Reading.—I remember the time when moths came to sugar, but in these days they appear to have given up the habit, at least here. *Catocala promissa* is recorded in "Newman" as occurring in Berkshire, but I never could find it all the years I have collected till last week, when I got one on a tree trunk near a very old oak wood. No doubt I could get a number here, if sugaring were any good, but at present it is useless to buy the sugar. I have taken *H. crassalis* and *Leucania turca* at Reading, also for the first time. *Pionea stramentalis* has been more abundant than usual, but I have found the commonest moth of the season, so far, to be *Chortodes arcuosa*, which fairly swarmed along the river bank and in the damp meadows. *Epione apiciaria* flies freely in the sallow beds it frequents at midnight.—W. HOLLAND, Reading. *July 28th*, 1890.

Isle of Man.—On my arrival at Ramsey on August 12th I found the weather very unsettled, and was at once informed that butterflies were scarce this season. I however noticed the following:—*Polyommatus phlœas* (very striking forms), *Lycæna icarus*, *Satyrus semele*, *Pararge megæra*, an occasional *Vanessa urticæ*, *Pieris rapæ*, *P. brassicæ* and dark *P. napi*, the latter fairly common, but worn. There was little to be done during the day, except beating over-hanging sandcrests; these produced only *Larentia salicata* and *Melanippe fluctuata*. The nights were extremely cold; but on a piece of waste ground adjoining my garden, grew a quantity of ragwort among mallow trees, which I worked nightly. Among the mallows I took a long series of *Eubolia cervinaria*, mostly males. A few *Scotosia dubitata*, *Boarmia repandata* (small), *Eupithecia constrictata*, *Cidaria russata* (nearly black) and *C. immanata* (very light) were beaten out in numbers from ash trees during the day. The following came to light but sparingly compared with my experience during previous seasons: *Luperina testacea*, *L. cespitis*, and *A. lunosa*. Sugaring failed altogether; the only species which appeared, being the ever-present *Xylophasia polyodon*. I therefore directed my attention almost entirely to searching the ragwort at night. As this plant grows in great abundance in the Island, I selected a pretty glen between cliffs for this purpose and was soon rewarded by taking some fine *Epunda nigra*. The following is a list of others I obtained in the same way: *Noctua xanthographa* (various forms), *N. glareosa*, *A. tragopogonis*, *Caradrina cubicularis*, *Agrotis tritici*, *A. valligera*, *Miana literosa*, *Tryphæna orbona*, *T. interjecta*, *Hydræcia micacea*, *P. meticulosa* (common), *Agrotis præcox* and *A. pyrophila* (rare). I was pleased on August 28th, to meet again with *Stilbia anomola*; the females appeared early in the evening sitting on the flowers of the ragwort, but, owing to the heavy rains for a week previous to that date, I found them all very much worn. I may here mention that, in South Wales, I took this species during two seasons about August 22nd, just emerged in fine condition. At Douglas and Ramsey I also spent a considerable time in searching for *C. xerampelina*, of which I took a nice series (commencing on August 26th), all very fine, though only the ordinary form. Most of these I found between 3 and 5 p.m. on and around the ash trees, in the grass, and among dead leaves, where careful searching was required. On the summit of Snaefell, 2,000 feet high, I found *Cidaria populata* and *Charæas graminis*. In collecting larvæ I did not work much, but brought home a good number of *Dianthæciæ* in *Silene maritima*, which had been gathered for me previous to my arrival. During a visit to the lovely Glen Helen, I noticed larvæ of *Abraxas ulmata* suspended from an elm tree overhanging a waterfall, and, pulling the boughs towards me with some difficulty, I picked off about two score. In my garden, on sallow, I discovered about twenty full-grown larvæ of *Sphinx populi* and *Arctia fuliginosa* feeding on ragwort. *Agrotis ripæ* occurred on *Chenopodium* on the sandy shore, where I dug up about one dozen, but found them much less common than on the opposite coast in Cumberland last year.

In conclusion, it may perhaps be interesting to botanists to hear that *Brassica monensis* was growing plentifully on the ground above the harbour ferry at Ramsey.—J. JÄGER, 180, Kensington Park Road, Notting Hill. *September 30th*, 1890.

ZEUZERA PYRINA (ÆSCULI) IN 1890.—I am glad to be able to report another successful season with this species. I have again found the moth abundant in the locality mentioned in the *Entomologist* of September last (vol. xxii., p. 234), and also in Highbury Fields, a park under the control of the County Council. The most remarkable take, however, was from a solitary ash tree in a front garden opposite my own door. This tree with a diameter of only a trifle over three inches, at a height of four feet from the ground, yielded no fewer than twenty-seven specimens. From June 24th, when I found the first moth, till July 26th, I visited all three localities once, and sometimes twice each day, and was thus enabled to be sure that my captures were made within a short time after emergence. In the old locality sixty-eight specimens were found, in Highbury Fields twenty-five, and on the solitary ash tree twenty-seven. In addition to these, a female was observed on the trunk of an oak at Highgate, when sugaring there on July 10th, and another was bred on July 15th from a pupa found in my lilac. Warm morning sun seemed necessary to bring out the imagoes. When the mornings were wet and the temperature low, none emerged. When the early morning was bright and warm, followed by rain before mid-day, some emerged, but were all more or less crippled. The proportion between the sexes was curiously different in the three localities. In the two new localities where I believe I captured every specimen that emerged, the results were: in Highbury Fields, four males to twenty-one females, from the solitary ash tree, twelve males to fifteen females; whilst in the old locality where, however, the height of the trees made it impossible to be sure that every specimen came under observation, twelve males and fifty-six females were obtained. In the old locality the ash was again almost the exclusive home of the insect, one specimen, however, emerged from a privet bush, and there was evidence that the hawthorns were infected. In Highbury Fields, the trees attacked were, without exception, young elms of a diameter of from an inch and a half to three inches; the young planes which alternated with these were entirely unaffected. The damage to the trees was very considerable; in the case of the large trees whole branches were killed, whilst the stems of the young trees were so weakened as to snap across in a high wind, and the solitary ash tree was completely killed above a height of four feet from the ground. The normal hours of emergence are more extended than I thought last year, and may be set down as from 11 a.m. to 4 p.m. The moths began to appear on June 24th, but, till July 4th, they were only found on the small trees. It may be that the heating effect of the sun's rays takes longer to penetrate the large trees. On July 7th, my friend, Mr. A. J. Hodges, spent a leisure hour in cutting a lilac in his garden to pieces, and, as a result, found several larvæ still feeding, and by no means fully grown. This would seem to point to the probability that *pyrina*, like *Cossus ligniperda*, remains more than one year in the larval state. I do not find, however, any suggestion of this in any of the authorities at my command.

I have not observed any striking variations, but a want of symmetry between the markings of the two sides is noticed in all female specimens. In size, the males range from an inch and five-eighths to two inches and one-eighth, and the females from two inches and one-eighth to two inches and seven-eighths. In the females, the metallic spots appear clear and bold, as if printed on the surface; in the males, all not situated on the margins of the wing, appear as if covered by a film. The males are much more uniform in marking than the females, and, as a rule, have the spots quite separate from each other. In a few specimens the large spots on the basal half of the inner margin of the fore wings are more or less united, but in none of my specimens is there any coalescence of spots in any other part of the wing. In the females, one notices a greater or less freedom from spots of a space on the fore wings between the sub-costal and median nervures, just beyond the middle of the wing; in some specimens the spots are so few here as to give the appearance of a white patch, whilst in others the space is hardly marked off from the rest of the wing. The size of the spots varies considerably in different specimens, as also does the amount of their coalescence. There is generally more or less union between the large spots on the basal half of the inner margin, in a few to such an extent as to give rise to a longitudinal streak in that situation. More rarely, the spots above the basal half of the median nervure coalesce and form a longitudinal streak.—F. J. BUCKELL, 32 Canonbury Square. *August 26th*, 1890.

HYBERNATING LARVÆ.—Will not some well-informed and experienced collectors commence a series of notes on the best way of getting the various hybernating larvæ through the winter? It would be very helpful to less experienced members. For example, I have beaten eight *Trichiura cratægi* larvæ out of sallows. Will they do best in a sleeve on the plant, or in a cage with dry bents and leaf mould, or how?

Many larvæ, like *Bombyx rubi*, are perfectly easy to manage in the right way, and almost impossible in any other way.

If some one must make a beginning, I am quite willing to do so—*Bombyx rubi*. Plant a root of heather out of doors, knock the bottom out of a cheese crate, put it round the heather and cover it with perforated zinc. My larvæ were under snow for a week. They came up in March, and seemed pleased to have new shoots of heather to sit on and spin among, but they ate nothing more.

Toxocampa pastinum. When the purple vetch is done, leave the dry stalks in an earthenware pot or bell glass inverted, and tie muslin over the top, keep cool and dry. I did not lose a single larva.

Apatura iris. Sleeve out on sallow, so that the larvæ can get on to the stem or a thick branch. They glue themselves on to the living bark, but are difficult to get through the winter. Tate, of Lyndhurst, got some through one winter, but failed last year. They must be moved off the sleeve every day, as none of his which hybernated on the sleeve survived.—G. M. A. HEWETT, S. Winefride, Winchester.

TIME OF APPEARANCE OF PLUSIA FESTUCÆ.—In No. 5 of the *Record*, I see a note on this subject by Mr. J. Collins. Perhaps my experience in the matter may be of interest. I have found that *Plusia festucæ* occurs regularly twice in the year here; at the end of June, and again in September. I have never seen the pupa of the June brood, but always get that of the September, when I look for it, and, as I have never looked for that of the June brood I cannot assert that it does not exist. I am inclined to think that the moth is double brooded, for the June specimens are in too good order for hybernated specimens. I take them in gardens at the back of these houses; my next door neighbour has a lot of turncap lilies, and these are a favourite haunt of the *Plusiæ*, but I have also taken them at sugar on the palings of my garden.—W. F. JOHNSON, Winder Terrace, Armagh. *September 5th*, 1890.

FOODPLANT OF EUPŒCILIA NOTULANA.—I have seen it stated that *E. notulana* is to be found feeding on *Inula dysenterica*, but I have only found it on mint, or, rather, in the stems of that plant, although *Inula* grows abundantly in the same place, in fact, mixed with the mint. I have examined a good number of *Inula* stems, but found no *E. notulana*.—N. M. RICHARDSON, Monte Video, near Weymouth. *August 30th*, 1890.

CAPTURE OF PSYCHE RETICELLA.—I captured this species on a salt marsh at the mouth of the Thames, flying in company with *Eupœcilia vectisana*.—J. A. COOPER, Leytonstone. *July 21st*, 1890.

NOTE ON TORTRIX DECRETANA (Tr.) AND T. LAFAURYANA (Reg.).—I have again bred a nice but rather short series of these species from larvæ feeding in united leaves and shoots of *Myrica gale* (bog myrtle), near King's Lynn. It is, however, to be regretted that both of these insects, which do not appear to have been yet recorded from any other district in the kingdom, should be so subject to ichneumon parasites. Moreover, these parasites are increasing to such an extent, that, from larvæ of *T. decretana* collected this year, I have bred at least three times as many of them as moths. Obviously both *T. decretana* and *T. lafauryana* must soon become scarce here, unless something occurs to lessen the number of their parasitical enemies.—EDWARD A. ATMORE, King's Lynn, Norfolk. *September 26th*, 1890.

DISTRIBUTION OF VIMINIA MENYANTHIDIS IN SCOTLAND.—In Dr. Chapman's very valuable and interesting paper on *Acronycta*, he expresses the opinion that *Viminia menyanthidis* does not occur in the Scottish Lowlands. By that he means, I suppose, Scotland south of the Forth and Clyde. It does, however, occur in the Lowlands, both east and west. In my notes I find records of it throughout Scotland from the Tweed and Solway to Moray and West Ross, and it probably goes further north. I have a note also that the larva is sometimes found on *menyanthes* (whence, of course, the name), but I never saw it myself on that plant.—F. BUCHANAN WHITE, Perth. *September*, 1890.

CAPTURE OF AEPOPHILUS BONNAIRII.—Yesterday I spent some hours in searching the rocks at low-water mark for the rare sub-marine bug, *Aëpophilus bonnairii*, and succeeded in finding one specimen. I had lifted a piece of seaweed and caught sight of the insect as it was disappearing in a crevice in the rock.—W. A. LUFF, 12 Mansell Street, Guernsey. *September 29th*, 1890.

PLUSIA MONETA AND CUSPIDIA ALNI AT TUNBRIDGE WELLS.—You may perhaps think it worth while to record in your magazine for this month, that I captured at light in the High Woods near this town on the 1st of July last a very fine specimen of *Plusia moneta*. I sent the specimen up to Messrs. Watkins and Doncaster (as it was unknown to me), and they have identified it as that species. I also captured *Cuspidia alni* at sugar in June, in a wood within a quarter of a mile of my house.—R. A. DALLAS BEECHING, 24 St. James' Road, Tunbridge Wells. *October 1st*, 1890.

CATOCALA PROMISSA NEAR READING.—I have to record the capture of a second fine *Catocala promissa* at Padworth, about eight miles from here.—(Mrs.) E. BAZETT, Springfield, Reading. *August 26th*, 1890.

EMMELESIA UNIFASCIATA.—A large proportion of this species usually remains in the pupal stage two years. I am now breeding specimens from larvæ collected in October, 1887, they having remained in pupæ three seasons.—W. G. SHELDON. *July 21st*, 1890.

RETINIA RESINANA.—I left Aberdeen May 26th for Forres, in search of the larvæ of *Retinia resinana*, and am pleased to say my journey was successful, although rather a long one. I found the larvæ rather common in resinous lumps on the fir-twigs, but whether this is their second year as larvæ, I cannot say, never having reared the species before. According to Mr. Adkin's experience, which was published in the *Entomologist* two or three years ago, this larva takes two years in feeding.—A. HORNE, Aberdeen, N.B. *July*, 1890.

FOODPLANT OF CATOCALA FRAXINI.—What is the natural foodplant of *C. fraxini?* Its name of course suggests ash. Newman gives poplar and ash. The first time I obtained ova of this species I sleeved them on ash, and lost the lot; they never began to feed. Next year I tried the ordinary Italian poplar, which they ate readily, and 22 imagines were produced from 24 eggs. The same year a Plymouth correspondent informed me that he had failed to rear them on ash. This season I forced some three dozen and fed them (in the hot-house) on poplar, and when the weather was suitable, sleeved them outside on the poplar, transferring 2 to the balsam poplar, and, for experiment, I sleeved 4 of the finest larvæ on ash. Those on poplar did well, on ash the larvæ died, not a single sign could I detect of the ash having been eaten. Has the larva ever been reared on ash in England? It seems very strange that the larvæ should refuse ash when half-fed, and starve in preference to eating it, if ash is a natural food. Perhaps some entomologist can tell me whether the larvæ will, under any circumstances, eat ash. If so, I should be much obliged.—HOPE ALDERSON, Hilda Vale, Farnboro', Kent. *July 30th*, 1890.

INSECT PARASITES.—The spider referred to by Mr. Milburn, of Darlington, in the *Entom. Record* (vol. i., p. 133), is *Chagletus venustissimus*. *Caradrina cubicularis* is frequently infested by it, probably through the moth's habit of resting in hay-stacks, etc. Last June I was unable, through pressure of work, to set immediately a couple of *Agrotis ashworthii*. I placed them in a relaxing pot nearly full of damp sand. On the sand was a piece of brown paper to rest the moths upon. In a couple of days I found the moths attacked by a host of similar, but white, spiders. They had eaten through the paper and attacked the moths. I have not got to the end of the puzzle yet. There was apparently, nothing in the pot but beaten sand, which, I ought to say, had been there a couple of years, a few drops of water, and the brown paper. The pot stands in a warm room, and is covered by a layer of damp cloth which fits closely under the tight earthenware lid.—J. ARKLE, Chester.

KILLING LEPIDOPTERA.—Notwithstanding the praises lavished upon ammonia, I still prefer the cyanide bottle, the active agent in which, by the way, is not cyanogen, but hydrocyanic, or prussic acid. The great objection urged against the cyanide bottle is that it makes insects so stiff as to render setting difficult. If, however, the insects be left in the bottle for forty-eight hours they will be found quite as supple and easy to set as if killed by ammonia, and will remain so for nearly a week.[1] The advantages of the cyanide bottle are its much greater handiness and decidedly more rapid action. This last is an important point, as the more rapidly an insect is killed the less chance is there of its knocking itself about in the death-struggle. A great objection to ammonia is the number of species whose colour is damaged by its action, as testified by its advocates. There are a few, such as *Agriopis aprilina*, *Hylophila prasinana* and *Melanargia galatea*, whose colour is injuriously affected by the cyanide, but they are much less numerous, and in these cases I use chloroform. Mr. Tutt's observation that insects killed by ammonia dry much more quickly than those killed by cyanide puzzles me. It is difficult to see why the mode of killing should influence the rapidity of evaporation of the fluids of the body.—FRANCIS JOHN BUCKELL, 32, Canonbury Square.

KILLING LIBELLULA DEPRESSA.—On May 24th I visited Epping Forest on my first excursion in search of dragonflies, having earlier found the larvæ abundant in the many pools. I carried with me a small homœopathic phial filled with oxalic acid in solution, and a small lithographic pen in case. One prick of the pen filled with the solution in the thorax of the *depressa* was sufficient to kill it, and the specimens were in good condition for setting in the evening. The smaller species I boxed, and killed with a cyanide bottle on reaching home.—R. MARSHMAN WATTSON, 14, Narford Road, Upper Clapton, N.E. *June 28th*, 1890.

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[1] This is exactly what I say. See Dr. Buckell's last sentence.

PRACTICAL HINTS.

By W. HOLLAND.

(*a*) Get the men who are potato digging in market gardens, to look out for large pupæ for you, and you will sometimes have a number of *Acherontia atropos* brought you.

(*b*) Do not fail to put on sugar every possible night now for *Dasycampa rubiginea.* It would probably be heard of in many more districts, if collectors did not give up the sugaring too early. A good place to try is in or near an oak wood. If ivy is not near or convenient to search, cut off branches with blossom and place in favourable looking spots, and it will double your chance. Even if you do not get *rubiginea*, other species as *Xylina semibrunnea, X. petrificata, and X. rhizolitha, Calocampa vetusta, C. exoleta, Hoporina croceago* and *Cidaria psittacata* may be attracted sometimes till the end of November.

(*c*) Examine stems of wild parsnip for larvæ of *Conchylis dilucidana.* The white frass is conspicuous just above the lower nodes of the stem. Cut off stems containing larvæ into convenient lengths and place in damp sand.

(*d*) Beat thatch of old summer houses in gardens, and *Alucita polydactyla* may be got in plenty.

(*e*) Beginning to middle of November, search after dark in birch plantations, and *Hybernia aurantiaria* and *Cheimatobia boreata* may be found in large numbers at rest hanging from the twigs and branches and also on the grass below.

(*f*) From about the 6th to 20th of November, look out for *Pœcilocampa populi, Petasia cassinea* and *Ptilophora plumigera* at light. The two first named rest on dark surfaces near the light (see *Ent. Record*, p. 20); *cassinea* is sometimes out a few days earlier than *populi.*

(*g*) Beat hedges containing spindle for *Pteroxia caudella* before it hybernates.

(*h*) Far more pupæ of *Smerinthus tiliæ* may be dug up at elm than at lime trees, and now is the best time to get them. Close up to tree only.

(*i*) Pull off bark from willow trees and rough fences near, for larvæ of *Apamea unanimis*, which hide away early, you will sometimes find pupæ of *Ptilodontis palpina* when doing this.

ERRATA.

Page 164, line 18 from bottom, "*Pastinum*" should be "*Pastinaca.*"
Page 164, line 5 from bottom, for *binævella* read *nimbella* or *senecionis.*

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*October* 1, 1890,—The Right Hon. Lord Walsingham, M.A., F.R.S., President, in the chair. The Rev. Dr. Walker exhibited, and read notes on, a long and varied series of forms of *Crymodes exulis*, collected in June and July last in Iceland. In reply to a question by Lord Walsingham as to whether all the forms referred by Dr. Walker to *Crymodes exulis* had been identified as belonging to that species, Mr. Kirby said the species was a very variable one, and that several forms had been described from Labrador and Greenland. Mr. South stated that he had examined Dr. Walker's specimens, and he believed that most of the forms exhibited had been described by Dr. Staudinger in his papers on the Entomology of Iceland. Dr. Sharp exhibited a specimen of *Ornithomyia avicularia*, L., taken near Dartford, to which there were firmly adhering—apparently by their mandibles—several specimens of a mallophagous insect. He also exhibited some specimens of fragile Diptera, Neuroptera, and Lepidoptera, to show that the terminal segments in both sexes might be dissected off and mounted separately without the structures suffering from shrivelling or distortion. Dr. Sharp also said, in reference to the statement made by him, on p. 421 of his paper recently published in the 'Transactions' of the Society, as to the number of the segments of the abdomen, and the position of the genital orifice in the female of Hemiptera-Heteroptera, that he had recently been making some dissections, and found that the structures externally were difficult of comprehension, and he now thought that the statement he had made from observation, without dissection, might prove to be erroneous. Mr. G. F. Hampson exhibited and remarked on a series of *Erebia melas*, taken in July last, in the Austrian Alps (Dolomites), by Mrs. Nicholls. Captain Elwes observed that this species was abundant in the Pyrenees; but although he had frequently suggested to Dr. Staudinger and other European lepidopterists that it probably occurred in the Swiss or Austrian Alps, he had never been able to obtain specimens from any part of Europe except the Pyrenees; and that it had been left to an English lady to be the first to take a species of *Erebia* new to these Alps. He added that the species only frequented very steep and stony slopes on the mountains, so that its capture was attended with difficulty. Mr. McLachlan exhibited specimens of an extraordinary Neuropterous larva found by Mr. B. G. Nevinson in tombs at Cairo. He said that this larva had been assigned to the genus *Nemoptera* by Schaum, who described it as having been found in tombs in Egypt (Berl. Ent. Zeitschrift, vol. i.); and Roux had previously (Ann. Sci. Nat. t. xxviii) described and figured it as an abnormal apterous hexapod under the name of *Necrophilus arenarius*. Mr. Nevinson supplemented these remarks with an account of his capture of the specimens in the Egyptian tombs. Mr. G. T. Baker exhibited a series of forms of species of the genus *Boarmia* from Madeira; and also a series of melanic varieties of *Gracilaria syringella* from the neighbourhood of Birmingham. Mr. W. F. H. Blandford exhibited and remarked on a series of specimens of *Dermestes vulpinus*, which had been doing much damage to the roofs of certain soap-works in the neighbourhood of London, where it had no doubt been introduced with bones and fat. Mr. R. W. Lloyd exhibited a specimen of *Carabus catenulatus*, in which the femur of the right foreleg was curiously dilated and toothed. He stated that he took the specimen at Oxshott, Surrey, on the 27th September last. The Rev. C. F. Thornewill exhibited a black variety of the male of *Argynnis aglaia*, taken by himself in July last on Cannock Chase; also a number of living larvæ of a species of *Eupithecia* feeding on the flower-heads of *Tanacetum vulgare* collected in a limestone quarry in Leicestershire. He expressed some doubt as to the identity of the species, but the general opinion was that the larvæ were only those of *Eupithecia absynthiata*.. Mr. H. Goss exhibited, for Mr. G. Bryant, a variety of the larva of *Trichiura cratægi.* Mr. C. G. Barrett exhibited a specimen of *Plusia moneta*, Fabr., a species new to Britain, taken at Reading by Mr. W. Holland in July last. It was stated that a second specimen of this species had been taken at Dover last June, and was now in the collection of Mr. Sydney Webb of that town. Mr. Kirby said that Mynheer Snellen had reported this species as being unusually common in Holland a few years ago. Mr. W. Dannatt exhibited a variety of *Papilio hectorides* from Paraguay. Mr. Osbert Salvin said he believed he had seen this form before. Mr. C. J. Gahan exhibited a curious little larva-like creature, found by Mr. Green in a rapid mountain stream in Ceylon, and observed that there was some doubt as to its true position in the animal kingdom. It was made up of six distinct segments, each of which bore a single pair of laterally directed processes or unjointed appendages. Mr. Hampson remarked that the appendages were very suggestive of the parapodia of certain chætopod worms, but that all the known polychætous worms were marine. Lord Walsingham and Mr. McLachlan expressed an opinion that the animal was of myriopodous affinities, and was not the larva of an insect. Mr. Baker read a paper entitled "Notes on the genitalia of a gynandromorphous *Eronia hippia.*"—H. Goss, *Hon. Sec.*

City of London Entomological Society.—*September* 18*th*, 1890.—Dr. J. S. Sequiera exhibited a box of lepidoptera from Bournemouth and the New Forest, including *Ennomos tiliaria*, *Luperina testacea* (very fine), *Triphæna orbona*, *Hydræcia micacea*, *Hesperia sylvanus*, *Melanthia ocellata*, *Pseudoterpna cytisaria*, females of *Satyrus semele*, *Ellopia fasciaria*, etc. Mr. J. A. Cooper, a small series of suffused *Bryophila perla*, and living imago of *Arctia menthastri.* Mr. Battley's exhibit of insects from Lyme Regis contained *Satyrus ægeria*, *S. megæra*, bleached forms of *S. janira*, *Arge galathea* with eye-spots, a yellow var. of *Zygæna filipendulæ*, *Lycæna agestis*, *Miana literosa*, several *Deltoides*, etc.; two fine specimens of a large green locust; several fossils, comprising vertebræ of *Ichthiosaurus* and *Plesiosaurus*, shells of *Ammonites*, *Lima*, *Gryphea*, and many others from the Lyme Regis district. Mr. Hanes exhibited series of *Noctua festiva* and *N. rubi.* Mr. Bellamy, males and females of *Satyrus semele*, one specimen having a broad streak on forewing and an eye absent. Mr. Clark, a very variable series of *Smerinthus tiliæ*. Mr. Goldthwaite, a very handsome series of *Thecla betulæ*, reared from larvæ obtained at Epping Forest, all the specimens were exceedingly fine. Mr. L. Tremayne, a series of *Fidonia piniaria* (all males), two *Saturnia carpini*, three *Macroglossa fuciformis*, and three *Bombyx rubi* (one very curious var., the lines on forewing meeting together and forming an arch). Mr. Simes, bleached *Satyrus janira* from New Forest, and stated that this form of the insect was much commoner than the type. Mr. Lusby, *Lycæna adonis* and *L. alexis* from Croydon. Mr. Milton's insects from Wellington included *Thecla quercus*, *T. W-album*, *Nemeobius lucina*, *Chelonia plantaginis*, *Melanippe hastata*, *Lobophora viretata*, *Eupithecia lariciata*, *Abraxas ulmata* (from Burton-on-Trent), *Asthena blomeraria*, *Dianthæcia cucubali*, etc.

Coleoptera:—Mr. Hanes, a number of beetles taken at sugar at Brockenhurst. Mr. Heasler, local species from the Isle of Sheppy, comprising *Anthicus humilis*, *Bembidium ephippium*, *Tachys scutellaris*, *Ptinus lichenum*, *Pogunus littoralis*, *P. chalceus* and *P. luridipennis*.

A discussion on the lateness of the season was introduced by Mr. J. A. Cooper, and taken part in by Messrs. Hanes, Battley, Simes, Tremayne and others. Dr. Sequeira called attention to the development of new foliage in some lime trees growing near his residence at Hackney. Observations were also made on the same subject by other members. The President reminded the meeting of the exhibition of *Tæniocampa* species on October 16th, and asked those present to bring exhibits of the genus.

October 2nd.—Mr. Conquest exhibited a series of *Geometra papilionaria*, bred from larvæ taken in Tilgate Forest, a bred series of *Plusia orichalcea* from the Cambridgeshire fens, together with fine series of *Notodonta cucullina*, *N. dromedarius*, *N. chaonia*, *N. dodonea*, *Cymatophora fluctuosa*, *Asthena luteata* and *Crambus pinetellus*; altogether this was a very fine exhibit. Mr. Tutt, for Dr. Chapman, exhibited a very long series of fine varieties of *Cuspidia alni* picked from a large number of bred specimens. Many of the specimens had the pale parts of the wings very much suffused with black scales (referred to as var. *suffusa*), while others presented every possible form of variation in the size and shape of the orbicular, from total absence to a large, well-developed, pupillated spot. Mr. Battley, a series of *Apamea ophiogramma*, captured at Stamford Hill, a dark form of *Boarmia rhomboidaria* var. *perfumaria* and a specimen of *Crocallis elinguaria* suffused with brown scales. Mr. Goldthwaite, *Pædisca sordidana*, *Conchylis francillana* and other species from the Isle of Wight. Mr. Clark, a series of *Aciptilia spilodactylus* from Freshwater. Mr. Simes, a series of *Cloantha solidaginis*, from Cannock Chase. Mr. Milton, *Nonagria typhæ*, *Gortnya flavago*, *Hydræcia petasitis* and others. There were several exhibitions of larvæ, beaten in Epping Forest during the week, chiefly *Platypteryx unguicula*, *P. hamula*, *Demas coryli*, *Ephyra trilinearia*, and *Notodonta camelina*. The reports from Epping seem more favourable than those of last year. A discussion on the family APAMIDÆ, and exhibition of the species of this group, was arranged for November 6th.

Coleoptera:—Mr. J. A. Clark exhibited *Leptura scutellata*, captured at the New Forest on August Bank Holiday; also *Astynomus ædilis* and *Rhagium bifasciatum*. Mr. Pearson, several living specimens of *Blaps similis*, from Stoke Newington. Mr. Battley, *Opilo mollis*, captured on October 2nd, at Epping Forest. Mr. Cripps, *Clythra 4-punctata*, from Brockenhurst, and *Toxotus meridianus*, *Strangalia melanura*, and *Malachius æneus*, from Chattenden. Mr. Heasler, *Lithocaris brunneus*, from Highgate, *Notiophilus rufipes* and *Trechus secalis*. Mr. Milton, the following from Tottenham:—*Carabus granulatus*, *Silpha littoralis*, and *Hydrous caraboides*. Mr. Milton also exhibited a very fine specimen of an Homopteron—*Zedra aurita*.—G. A. LEWCOCK and E. HANES, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*September 25th*, 1890.—Members seem to have returned to town again, as the attendance was better than it has been for some time. *Mr. Adkin* exhibited larvæ of *Aplecta occulta*, and imagines of

Homœosoma binævella and *Myelophila cribrum*, both from thistle; and made remarks on the protective resemblance of the latter species to the glumes, etc., on the flowering stems of a certain grass, which grew in amongst the thistles. Mr. Mera exhibited a very nice series of *Bisulcia ligustri*, and a var. of *Argynnis euphrosyne* with the central area of the wings banded, taken at Chattenden last June. Mr. Barker exhibited *Boarmia repandata* var. *conversaria*, vars. of *Hypsipetes elutata* and the dark banded form of *Camptogramma bilineata.* Mr. Jäger exhibited the specimens of *Callimorpha hera* recorded in last month's number, and a large box of Manx captures, and read a note on his work in the Isle of Man, a full account of which is given in the "Notes of the Season" for the month. Mr. Wellman, comparative series of *Hyponomeuta padellus*, *H. cognatellus* and *H. evonymellus.* Mr. Fenn, Scotch forms of *Cidaria immanata*, extreme forms of *Agrotis cursoria*, and a specimen of *Ephestia ficulella* captured in the room where the meeting was held. The most interesting exhibit of the evening was that of Mr. Bright (Bournemouth). His box contained a fine lot of local varieties, including the dark form of *Limenitis sibylla* (New Forest); two specimens of *Urapteryx sambucata* (Wolverhampton) showing extreme variation in the direction of lines on superior wings; vars. of *Arctia caia*; *Vanessa urticæ*, reported as captured by Mr. Mountford at Polegate, showing apparent reversion to an American species, *Argynnis paphia* vars. with pale areas, from the New Forest *A. adippe* var. *cleodoxa* from Sussex; splendidly suffused vars. of *Venusia cambricaria* from Sheffield; a fine var. of *Boarmia roboraria* (New Forest); a magnificent series of the dark and red vars. of *Tæniocampa gracilis* from the New Forest, and a series of the heath form of *Œnectra pilleriana* (Bournemouth), which is strikingly different from those obtained by Mr. Eustace Bankes and other collectors in Dorsetshire; other varieties included aberrant specimens of *Syrichthus alveolus* (New Forest), *Boarmia repandata* (English and Scotch forms), *B. abietaria*, *Tephrosia biundularia*, *Larentia cæsiata* (Rannoch), *Coremia propugnata*, *Fidonia atomaria*, etc. Mr. Carrington made some remarks on the capture of *C. hera*; Mr. Fenn pointed out that this species was first captured in England by Mr. D'Orville; Mr. Tutt stated that specimens had been captured this year by Mr. Hollis, and that there was no doubt about the authenticity of these captures; Mr. C. G. Barrett quite agreed that there was no doubt thrown on the authenticity of these specimens, but the doubt arose some time ago as to its probable introduction; Mr. Tutt pointed out that the locality where these were taken, was very near the geographical limit of the species, but that the climatic conditions in Devon would be favourable, an opinion with which Mr. Jenner Weir acquiesced. Mr. Cockerell gave a most interesting account of the phenomenon of "alternation of generations," as observed in certain gall-flies and its bearing on parthenogenesis. Mr. Carrington wished to correct an error (*Record*, p. 165); he did not find larvæ of *A. lathonia*, but made an almost unsuccesful search for ova. Messrs. Bright, Carrington, C. G. Barrett and J. Jenner Weir joined in a discussion on the food of *Lycæna ægon* in which was a good deal of speculation and but very little fact. The meeting was brought to a close by Mr. Jenner Weir reading some notes from New Zealand and Australia.

October 9th.—Several interesting exhibits took place. Among others, Mr. C. G. Barrett exhibited the specimen of *Plusia moneta* taken at Reading by Mr. Holland, and expressed an opinion that the species was gradually spreading northwards. Mr. South, ordinary specimens of English and Scotch *Noctua festiva*, with a few specimens of the Shetland variety. Mr. W. West, a series of *Celæna haworthii* from Derbyshire. Mr. Cockerell, four most interesting specimens of *Colias eurytheme*:—(1). *C. amphidusa*, (2). *C. keewaydin* (spring form in the Rocky Mts.), (3). *C. ariadne* (winter form in Texas), (4). *C. eriphyle* (autumn form in the Rocky Mts.). These four forms had been shown to be one species by breeding one form from eggs laid by another. An exhibition of four specimens of *Argynnis euphrosyne*, produced from ova laid in June, led to a discussion as to whether this species and *selene* were double-brooded in nature. Several members stated that they had met with occasional specimens of the second broods of this species.[1] Mr. Tugwell exhibited bred *Heliophobus hispidus*, and referred to the fact that there was no appreciable violet tinge on the specimens. Mr. Tutt remarked that in specimens he had bred from pupæ, given him by Lieut. Brown, there was no such tinge. He also pointed out that his remarks *re* the species (*Varieties of British Noctuæ*) were perfectly correct, and that our specimens are in no way identical with Hübner's figure, although in a note published in the *Entomologist* some time ago, it might be supposed that his remarks were inaccurate. Mr. Fenn exhibited some good forms of *Triphæna orbona*, *Agrotis nigricans*, *Viminia myricæ*, and *Cnephasia octomuculana* from Scotland, also one specimen of *Agrotis pyrophila* from Aberdeen. Mr. Tutt exhibited for Lieut. Brown, a magnificent series of *Agrotis pyrophila* from Portland, two of the specimens being especially ochreous, and others showing a fairly developed central band. He also exhibited Scotch specimens for comparison. Mr. Joy, living larvæ of *Toxocampa pastinum* from Cambridgeshire. Mr. J. Jenner Weir, two fine *Vanessa milbertii* from North America, with *Vanessa urticæ* for comparison, and remarked that the specimen exhibited as a var. of *V. urticæ* by Mr. Bright at the last meeting, and stated to have been captured at Polegate, was, as Mr. Tutt had suggested at the previous meeting, *V. milbertii*, and could not possibly be British. Messrs. Cockerell, Jenner Weir, and Tutt made other remarks about this specimen before the matter dropped. Mr. Billups exhibited parasitic Hymenoptera, and Mr. Cook some beautiful nests of *Vespa sylvestris*. Mr. Tutt referred to a *Pyrale*, which had been caught near Chepstow and given to Mr. Mason, who sent it to him for identification. This, he pointed out, was a probable importation from South America, and a species new to science. The rest of the evening was amusingly spent in a personal discussion relating to the reports of the Society, and the unique position of the Society in not sending official reports within a few days of the meeting to the *Record*. As a result, it would seem that the Council are quite out of touch with a large proportion of members on this subject.—Ed.

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[1] *Selene* is recorded as occurring in Perthshire in August this year, in this month's *Record*.—Ed.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 150.)

ACRONYCTA (*Viminia*) *venosa.*—It must be some thirty years since I first reared this species, and was impressed with its close resemblance, especially as a pupa, to *rumicis* and *menyanthidis*, with which species I was very familiar, and whose differences from *psi* and *leporina*, the other species of *Acronycta* I knew most of, were so much greater than separated them from *venosa*. It was therefore with much pleasure that I received a batch of fertile ova from Mr. W. H. B. Fletcher, after having in vain tried to secure ova from moths reared in captivity. I may have something further to say about the pairing of *Acronyctas* in confinement, a subject on which, however, I am still nearly as much in the dark as my experience of *venosa* would appear to indicate; for with this species I have entirely failed in three several years; yet Sepp relates that he obtained two larvæ. These happened to emerge together, a male and female, and, pairing, provided him with a batch of eggs. The batch of eggs I had was in fact two batches laid by the same moth, and consisted of several hundred eggs. Having laid one batch, the moth, finding, I presume, no tempting place to lay another, disposed them as a second layer over the first. This was, of course, an accident that would not happen in a state of freedom, and was fatal to the hatching of the under layer. Nearly the whole of each layer consisted of eggs laid in one imbricated set, each egg overlapping its neighbour about one-fourth of its diameter. Each egg is overlaid by three others, or, where a little irregularity occurs, by four others; the regularity of the arrangement was very exact; in *rumicis* the eggs overlap a little further, and are not unfrequently a little less regular in the orderly arrangement of the rows of overlapping eggs.

In *venosa* the silky lustre of the group of eggs is more striking than in any other species, but is approached by *rumicis*. When first laid, the eggs are of a sulphur yellow, but soon become reddish brown, with paler markings, much in the pattern of *rumicis*, as regards size and arrangement, but less definite and distinct and without the dark apical mark. The ribs are fewer than in *rumicis*, about 41 to 45, being thus a little larger and bolder; the crenulations or secondary ridges are somewhat more evident, and terminate towards the summit or micropyle in rather more decided mammellæ. The diameter is from 0·95 to 1·1 mm.; the height must be about ·4 mm., but I got no satisfactory measurement, owing to the attachment of the eggs to each other.

The larva, when newly hatched, is whitish, but soon gets darker, and much resembles the other species of *Viminia*. 3.4, 6.7, 10.11, and 13 are pale segments, 2 is also rather pale, head black (as in others). The tubercles are distinctly larger and darker in the dark segments, paler and rather smaller in 10, and especially so in 11. The anterior trapezoidals stand up prominently, so that, seen laterally, they form a serrated dorsal ridge, especially marked in 3.4, 5.6, and 12, and notably deficient in 11; each has 3 hairs, except 4 in 9th and 5 in 12th segments; the other tubercles have each 1 hair. The hairs are long, about 1 mm. (larva 2 mm.), and several, especially in 13, longer. The larva is rather paler than the other *Viminia*, the tubercles being deep brown rather than black. In *rumicis*, which comes nearest to *venosa*, the tubercles are also not quite black as in the others, but are even rather paler than in *venosa*. As the larva grows, the distinction between the pale and dark segments becomes more marked than at first. The scutellum of the 2nd segment has 4 hairs on either lateral half; this is the same as in the other *Viminia* of which I have a note. As compared with *rumicis*, the larva is paler, tubercles smaller and blacker, but the form of the tubercles, disposition of hairs, and relative size of the 11th segment seem identical. In the full-grown (in 6th skin) larva, the alternation of pale and dark segments is perhaps more marked than in the other species of *Viminia*.

The description of the several stages becomes rather monotonous. It is noted, as in the other species, that in the

2nd skin (after the 1st moult), the tubercles are black, and so closely packed as to make the larva at first look black; 10 is a weak, and 11 a very weak segment, as regards the development of the tubercles; on the others, the anterior trapezoidals form a large boss, each spiculated like a hedgehog by the bases of the hairs, which are 8 or 9 in number, 5 or 6 on the posterior trapezoidal, and 6 or 7 on the supra-spiracular, the post-spiracular already dwindled to little more than a point with 1 hair. The alternation of light and dark segments is still very plain, the posterior spiracular tubercle is very small; on segment 12 the trapezoidals are welded into one boss, the 11th is still markedly small. The larva gets thicker from 1 to 5, remains nearly uniform in 6 and 7, tapers again to the 11th segment, the 12th being again large. In some specimens, there is a lighter region, almost amounting to a band, between the trapezoidal tubercles, and, in a very few, a white patch on the dorsum of the 3rd segment. They still like to feed gregariously, but a solitary larva does not appear altogether unhappy, as is the case with distinctly gregarious larvæ, such as young *Moma orion* or *Endromis versicolor.*

After the 2nd moult (in 3rd skin), the colour is rufous, marbled in two shades, with an indication of a paler line between the anterior and posterior trapezoidals, most marked on 3.4, 6.7, 10 and 11, and there is a decided white spot above the subspiracular tubercles of 2, 3, and 4; roughly speaking, however, the general tone and tint is fairly uniform, and shows up the black tubercles distinctly; these possess 3 or 4 strong and 6 or 8 paler bristles, they are not quite so large as in *rumicis*, the post-spiracular still exists as a dot.

The 5th segment is the largest, and thence the larva tapers regularly backwards, the 12th segment being a doubtful exception, owing to the rather larger size of its tubercles. When full grown (in 3rd skin), the dorsal region, extending to the anterior trapezoidals, is darker (brownish fuscous), and a yellowish band may be described between the trapezoidals, whilst below them the sides are marbled with brownish fuscous and a dirty yellowish white.

In the 4th skin, when the larva has attained a length of 14 mm., the colours are black and orange, the bluish grey sides and yellow subdorsal band contrasting with the black tubercles, somewhat suggest the full-grown larva of *Pontia brassicæ.* The dorsal area, between the anterior trapezoidals, is a deep reddish brown, almost black; between the trapezoidals is an orange band, between the posterior trapezoidal and the spiracles is again chocolate brown, and the subspiracular is orange yellow. These yellow bands are a pronounced portion of a system of transverse marbled lines, which, in the chocolate area, are bluish grey, and are very sparse on the dorsal region, but on the lower area cover more space than the chocolate brown colour, the tubercles black, also the head, except two narrow brown lines on each side, one bounding the clypeus and the other a little higher up. Beneath, the colour is a pale chocolate, with the marblings of a greyish green. Each tubercle carries several long black hairs, about the diameter of the larva in length, but longer on 3, 12, and 13, and more abundant, but shorter, whitish-brown ones. The larva is thickest about 3 and 4, and tapers gradually backwards. The tubercles on the dorsum still give a serrated aspect to the outline seen laterally, which is similar in the other *Viminia*, but for some reason does not strike one so distinctly as in this species.

In the 5th skin, the larva is very similar to the 4th; the description I have taken differs somewhat in its expression, and may assist in forming a picture of the larva, otherwise the repetition would be redundant. The length is 21 mm. It tapers slightly backwards,with a suspicion of a hump on 12. A hairy blue grey larva, with blacker back and yellow subdorsal line; the post-spiracular tubercle is reduced to a hairless dot, the others are all well developed, with two black hairs and many (about 15) pale ones two-thirds the diameter of the larva in length, and some (on 2, 3, 4, and 12) are twice as long as the others—tubercles black, skin black but thickly marbled with paler streaks; in the back these are reduced to a few pale dots, between the trapezoidals they coalesce into an irregular orange yellow band, lower they are still numerous, of a whitish blue grey, giving a general grey tone to the larva; on the subspiracular line they again unite in a narrow broken line of an orange yellow colour round the subspiracular tubercle, and a similar patch extends upwards, and includes the spiracle and the post-spiracular tubercle. The pale marblings form circles round the tubercles, especially the posterior trapezoidal and the supra-spiracular. The head is black with white labrum and palpi.

In the last skin, the larva attains a length of from 34 to 40 and 45 mm., a hairy larva, marked longitudinally with *black, grey,* orange, and yellow. It has now no *rumicis* form, but is fairly cylindrical, tapering a little at each end, the head is set on squarely, and it does not protrude the jaws, nor does it draw itself up into any humped attitudes, nor curl itself round. There is a good deal of variety in the brilliancy and darkness of colouring of different larvæ. The general arrangement and character of markings is as in the previous skin. Assuming the black to be the ground colour, it is broken up by narrow streaks, mainly in transverse lines of colour, which is, in places, pale creamy ochreous, in others, brick red. These form a nearly continuous band between the trapezoidals as a paler subdorsal line, and also a nearly continuous subspiracular line. The dorsal area, between and in front of the anterior trapezoidals, forms a black dorsal band, broken up behind the trapezoidals by the transverse lines, of which six may be counted—they are much interrupted, and do not materially interfere with the apparent continuity of the black dorsal band; the pale subdorsal band has an irregular margin owing to the branching off of the pale streaks, it lies between the anterior and posterior trapezoidals, and almost includes both of them. Its colour is a brick red on the middle and front portion of each segment, yellowish ochreous behind.

The next section reaches from this down to, and including, the spiracles; it is black, but much broken up by the yellow ochreous streaks or marblings, which are most numerous on the posterior part of each segment, less so in front and least so in the neighbourhood of the supra-spiracular tubercle. The lateral or subspiracular line is yellow, but at the centre of each segment it is red; here it includes the large subspiracular tubercle, and, stretching up behind the spiracle, includes the small post-spiracular tubercle. The spiracle itself in front of this, is conspicuously white, in a darker patch belonging to the zone above. This lateral area is identical in form and in relative colour with the lateral line in *rumicis.* Immediately on moulting into this skin, the colours of this band in *venosa* are much more brilliant, and not far from those of *rumicis.* This is notable, as it is the rule for colours to be pale and less pronounced immediately after a moult. Indeed, I have, in describing the younger stages of these larvæ, erred, in noting how, after each moult, or on hatching, the blackness of the tubercles packed together makes the larva appear black, although, as it grows, and they separate, the paler colour of the skin asserts itself. *Immediately* on hatching or moulting, however, the larvæ really look pale, as the tubercles are then a pale ashy grey, and it takes some time, often very short, for them to assume their inky blackness. To return to *venosa,* the lower surface is black with pale cinereous marblings, but the actual ventral surface is paler, with tendency to central black line. The surface, from the centre of the subdorsal band downwards (excepting the subspiracular line), is finely dotted with minute black hair points, though it is hardly possible to say there are any hairs, as they are nothing more than these points. The tubercles are rounded bosses carrying 15-20 hairs, the *supra-spiracular* and *ventral* are black, the rest reddish, the *post-spiracular* is very small, with only one or two hairs. The trapezoidal and supra-spiracular tubercles have each 4 or 5 black hairs stiffer than the others, which are rufous, as are those on the other tubercles. The lateral line does not extend to the 13th segment, but the lateral tubercle is red, and on 14, pale, almost yellow.

The hairs are about 2 mm. in length, longer at each extremity, a few in front being as much as 9 mm. The anterior portion of the 2nd segment is black, with two orange dots,—apparently trapezoidal tubercles—its anterior margin is fringed with rufous hairs, falling closely over and obscuring the head; the rest of the segment is darker than the others; on the 3rd segment, the darker areas are stronger than on the others, at the expense of the lighter, both towards its anterior and posterior margins, the legs are black, the head black, with an orange-brown inverted V above the clypeus, and three irregular streaks on the cheek, arranged as if radiating from the jaw; palpi and labrum yellow (nearly white), jaws black.

The larva here described is the palest and most richly coloured, others are much darker, and some may be almost black. Some, again, have a paler line on the whitest part of the lateral line. The head and spiracles (white) do not vary in colour. The black specimens have a hoary look from the pale hairs over the black skin. As the darker larvæ get full-fed, they show rather more of the paler marbling, giving indications of the subdorsal and lateral lines, especially towards the incisions, the marblings indeed may always be detected with a glass, though so darkly coloured as to have little effect on the general tone of the larva. This is especially so near the incisions and in the regions of the subdorsal and lateral lines. The outer sides of the anterior trapezoidal tubercles and the subspiracular and post-spiracular tubercles are obscurely reddish *in these darker* larvæ.

In a very pale larva, the black dorsal area is only pronounced between the anterior trapezoidals, and is then brown rather than black, the subdorsal yellow is not defined from the marblings of the area, below which, the colour is rather of a pale greenish yellow with black spots than dark, as in other specimens. The white spiracles, so conspicuous in a black larva, are here hardly seen.

When ready to spin up, this larva voids some damp frass, very unlike the dry material of a feeding larva, and shrinks very much in bulk, diminishing in length from 45 to 33 mm., whilst the colours lose all definition and brightness. *Rumicis* loses little or nothing in bulk before spinning up. It suggests itself to me, that the food of *venosa*, being bulky in proportion to its nutritiousness, the larva is, for its accommodation, more expanded than in the other *Viminia*, though *auricoma* has a good deal of the same habit of shrinking and voiding moist frass before opening. This is, indeed, I believe, really a very universal habit, though varying much in degree, the large silkworms, *yama-mai*, *cecropia*, etc., voiding some actual fluid when preparing to spin.

In its habits, the larva is not unlike the other *Viminia*. The young larvæ take each a line of cells in the leaf of the grass or reed, and eat the surface between the septa on either side, and, as they are at first somewhat gregarious, they have a processionary aspect, attacking adjacent series of cells, and this habit lasts into the 3rd skin, when they are more independent and devastate the leaf more thoroughly. Some gregarious larvæ pine and refuse to eat when solitary; of all the larvæ I have experimented with, this is most marked in *Endromis versicolor* when young. But I think there is a decided amount of the same habit in *Viminia*, at least in *venosa*, *auricoma*, and *menyanthidis*, when small, and would be in *rumicis*, were he not so hardy as to stand much ill-usage with impunity. Isolated *rumicis* in their 1st skin seem disconsolate, and they all wander about till they find their brethren. They coil up when disturbed, and when larger, have a curious way of apparently desiring to drop when coiled up, but really retaining a hold by the anal prolegs. *Venosa* does not coil up so readily and completely as the others.

The cocoon is of whitish silk, and made amongst dead grass, leaves, bits of reed, or any other available *débris*. It has a rather weaker place at the top for emergence; the colour of the silk is very like that of *auricoma*. The cocoon is perhaps rather longer and more slender than that of the other species, but could not be easily distinguished from them, except by the character of the material amongst which it is made.

The pupa is very like that of *rumicis*. The mesothorax does not project backwards, as in *rumicis*, and the following segments are relatively smaller, the thoracic and fixed abdominal segments are more slender, making the whole pupa look more delicate and slender than *rumicis* or any other *Viminia*. The marginal hoops of the six abdominal segments are nearly as pronounced as in *rumicis*, the rough points cover the rest of the segment, and are nearly as large as in *rumicis*. The segmental incisions, *i.e.*, the softer chitinous parts of the free segment, are black and finely granulated, as in the other species. The frontal knobs are the same as in *rumicis*. The anal armature is very similar, the pen-nib-like termination is a little longer and more slender, it has the same four points, and a faint indication of a central dorsal one, the bristles are more strictly terminal, not covering quite so wide an area, and are perhaps a little longer, stiffer, and darker in colour. The minute hairs, at the base of the antennæ, etc., appear to be identical.

Among the points, in which this species is clearly very closely allied to *rumicis*, none is perhaps more remarkable than the lateral line of the full-grown larva, the outline of which, and relative colouring, are identical in the two species.

In *rumicis* (a loud vulgar fellow), the lateral line might be described, as two broad white dashes, anteriorly and posteriorly, on each segment, connected by a brilliant red patch. With the same outline, the red is, in *venosa*, much toned down, and passes without great contrast into the paler yellow portions, and so forms a tolerably regular band. In a genus like *Acronycta*, where the larvæ, even of closely allied species, are so different from each other, in form, colour and markings, a close identity like this appears to imply a near relationship. The eggs are also very similar, those of *venosa* are perhaps less specialised than those of the other species of *Viminia;* not having the bold pale markings of *auricoma*, or the distinct special dot and pale circle of *rumicis*, they, nevertheless, more nearly resemble those of *rumicis*, than do any of the other species of *Viminia*, and, in groups, the two species have much the same tone and silky lustre. The pupæ are very similar, *venosa* looks more bulky in the abdominal segments, or, more correctly, is more slender thoracically, generally enough so, to enable an opinion to be formed, as to which species is under examination; the general surface gives also an impression of less roughness, because it is usually more fully extended, as though better fed up, and the smoother portions of the segments are more in evidence, but as to the details of sculpture, the frontal nodules, anal armature, etc., there is rather an identity than a resemblance between the two species, and a number of pupæ of both species mixed together, would be as difficult to separate as would those of *psi* and *tridens*, except that the intersegmental membrane is black in *venosa*, and brown in *rumicis*.

(To be continued.)

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Cuspidia alni var. *suffusa* (Tutt), Lewcock and Hanes, n. var. *Ent. Rec.*, 190.

Pyralid, caught near Chepstow, Tutt, South Lond. Ent. Soc., Oct 9th [=*Aphytoceros* n. sp. aff. *nigrolinealis* (Warren); no doubt an accidental introduction].

Zygæna loti varieties *lonicerœ* (Esp.), *eboraci* (Prest), *trifolii* (Esp.), *confluens* (Staud.), *lutescens* Tutt, *orobi* (Hb.) = *trifolii* of many authors, and *ytenensis* Briggs = *meliloti* Auctt. Angl.—C. W. Dale, *Young Nat.*, October. See *Ent. Rec.*, 175.

Some works bearing on the nomenclature of our Geometers and Pyrales, which have recently appeared, deserve notice:—

C. Freih. v. Gumppenberg. Systema Geometrarum zonæ temperationis septentrionalis; in *Nov. Act. Leop.-Car. Akad.*, 1890.

In this great descriptive work on the Geometræ of the north temperate region, the nomenclature differs much from that familiar to us in England. *Rheumatoptera*, for instance, is an immense genus, including among other things our *Melanthia bicolorata* and *ocellata*, *Melanippe hastata*, *tristata*, *montanata*, *sociata*, *rivata*, *galiata*, and *fluctuata*, and even *Asthena blomeri*, and *Camptogramma bilineata*. *Lygris* Hb. includes our *Cidaria silaceata*, *reticulata*, *populata*, *testata*, and *prunata*. Many varieties are enumerated, but there is not very much that is new. Under *Rheumatoptera* [*Camptogramma*] *bilineata*, is described a new variety, *infuscata*, having the median area of the wings more or less infuscated. This variety may be entered in the British list, as it is familiar to our collectors.

R. South. Additions to the British List of Deltoids, Pyrales, and Crambids since 1859. A series of papers now appearing in *Entom.*, compiled mainly from the original records, which are somewhat inconveniently scattered. On p. 330, *Ephestia roxburghii* Gregs., following Ragonot, is maintained as a good species.

E. Meyrick. On the Classification of the Pyralidina of the European Fauna. *Trans. Ent. Soc. Lond.*, Sept., 1890, 429-492.

Certainly a very useful paper, though there will be some difference of opinion about the generic nomenclature. Those who are specially interested in the group will read the original paper, but it will be convenient to note here some of the deviations from our present nomenclature. *Phlyctænia* Hb. includes our *Scopula prunalis*, etc., and is the *Scopula* of Meyrick, *olim*. *Loxostege* Hb. includes *Spilodes sticticalis* and *verticalis*. In the *Crambidæ*, *alpinellus* Hb. appears as a *Platytes*. The *Pterophori* present several changes, so that we get *Trichoptilus* Wlsm., with *T. paludum* (Zell.); *Stenoptilia* Hb., for *pterodactyla* (L.) and others; *Alucita* L. has no longer any connection with *hexadactyla*, but is used for *monodactyla* (L.), *lithodactyla* (Tr.), etc. *Orneodes* is used for *hexadactyla*. *Crasimetis* n.g. includes *Leioptilus brachydactylus* (Tr.), which has been elsewhere referred to *Pselnophorus*[1] Wallgr. *Pterophorus* Geoff. includes *galactodactylus*, *spilodactylus*, etc.

Hymenoptera.

Cameron's *Monograph of the British Phytophagous Hymenoptera*, vol. iii., 1890, contains much that is new or interesting. *Cimbex sylvarum* is described with three varieties, *tristis* (Fb.), *sylvarum* (= the type), and *varians* Leach.

Pseudoneuroptera.

Mr. W. F. Kirby's *Synonymic Catalogue of Neuroptera Odonata* (1890, p. 202) will be of immense service to all students of these insects, whether they accept his nomenclature or not. So far as the British species go, the tabulation of their synonyms and varieties is very useful, and there are several alterations in generic names to be noticed. Thus, we get *Agrion virgo* (L.), *Micronympha pumilio* (Charp.), *Cœnagrion puella* (L.), and *C pulchellum* (Lind.)

There is a genus of *Pompilidæ*, by the way, called *Priocnemis* Schiödte. Mr. Ashmead, in his catalogue of the Hymenoptera of Colorado (Bull. i., Colo. Biol. Assn.) spells this *Prionocnemis*. Now is this correct? If so, which will have to give way, the amended *Priocnemis*, or the dragonfly genus *Prionocnemis* Selys, 1886, mentioned in Mr. Kirby's catalogue?

Homoptera.

Idiocerus nubilis n. sp., Buckton. Mon. Brit. Cicad., Pt. iv. Oct. 1890, p. 118. Pl. xxv. figs. 4, 4a. Haslemere. Bronzy or olive-green is the general colour. Abdomen greyish-black.

—T. D. A. C.

SCIENTIFIC NOTES.

Hybrids between Smerinthus ocellatus and S. populi.—In the *Record*, p. 95, I recorded that I obtained ova from a pairing of these two species. These ova proved fertile, and the larvæ fed up rapidly on willow in my garden. The birds must have taken a good many, but those I took in turned to pupæ from July 20th to July 27th. Strange to say, instead of going over the winter, as *S. ocellatus* and *S. populi* pupæ generally do, I bred the imagines (ten in number) in three weeks. Although larvæ of *ocellatus* and *populi* fed up side by side with them, and turned to pupæ about the same time, I have had none of the typical specimens emerge. Why should the hybrid emerge and not the others?—P. Kirk, Dura St., Dundee. *October*, 1890.

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[1] *Pselnophorus* will take precedence.—Ed.

[Mr. Kirk has generously sent me five specimens of the ten he reared, as well as a preserved larva. They are perfectly intermediate between the two species. The fore wings have all the characters of both species, the basal line as in *populi*, but with distinct traces of a shade showing the angulation of the basal line in *ocellatus*, the hind wings have the fulvous basal patch of *populi* (no red colour) and indistinct eye spots characteristic of *ocellatus*. My five specimens are four males and one female, the sexes appearing to be quite distinct.—Ed.]

Aphytoceros vagans (mihi), a Species new to Science.—A few weeks ago Mr. Mason, of Clevedon, sent me a Pyralid moth, taken at Chepstow, asking me if I could get it named for him. I handed it over to Mr. Cockerell, who, after carefully comparing it with the British Museum species, has come to the conclusion that it is probably new to science. It is, apparently, a native of South America or the West Indies, which has been accidentally imported. The species has close affinities with *Aphytoceros nigrolinealis*. It has a strong superficial resemblance to our *Hydrocampidæ*, with the anterior wings iridescent bluish-white; the basal portion of the wing dark brown, slight traces of stigmata, with a strongly iridescent patch on the inner margin of the wing, crossed transversely by a pale brownish band; posterior wings silvery white. A full description of the species by Mr. Cockerell will appear shortly.—J. W. Tutt. *November*, 1890.

NOTES ON COLLECTING, Etc.

Eupithecia venosata in Silene inflata.—The larvæ mentioned (*Record*, p. 180) as being captured in *Silene inflata* and supposed to be *Emmelesia affinitata*, proved to be *E. venosata*. I found *E. affinitata* larvæ afterwards, but only in red campion.—M. Kimber, Newbury, Berks. *November 6th*, 1890.

Notes of the Season (Lepidoptera).—*Deal and Dover.*—From the 24th July, I spent a month collecting at Deal, the first three weeks in the company of Mr. Tutt. As every one knows who has visited this locality, success is greatly dependent on the amount of sunshine and absence of wind. Of the former no complaint could be made, but the westerly and south-westerly gales which blew, especially during the last ten days of our stay, made collecting at times nearly impossible. Admittedly a bad season, if not the worst, in the memory of most of us, it was accentuated by the unattractiveness of sugar. The year opened well and continued so until the end of May; at that time the majority of the species were at least ten days in advance of their period of emergence in recent years; but the cold nights of June and July gradually forced everything back, until, by the end of the latter month, nearly everything was a fortnight late.

Our record was not remarkable for anything new or particularly rare. *Rhopalocera* were conspicuous by their absence, and we only noticed such as *Lycæna corydon*, *L. astrarche*, *Arge galatea*, the common *Vanessæ*, etc. Sugar produced nothing of note, *Leucania straminea*, *L. conigera*, *Nonagria fulva*, *Cœnobia rufa*, *Hydrœcia nictitans*, *Apamea sublustris*, *Cerigo cytherea*, *Luperina testacea*, *Mamestra abjecta* (1), *Caradrina blanda*, *C. cubicularis*, *Agrotis valligera*, *A. puta*, *A. suffusa*, *A. corticea*, *A. nigricans*, *A. tritici*, *Noctua rubi*, *N. umbrosa*, *Hadena chenopodii*, *Miana furuncula* and *M. literosa* were the best of a bad lot. On the sandhills *Lithosia pygmeola* was scarcer than usual, and I fancy the day is not far distant when this species, as far as Deal is concerned, will cease to exist. A few *Crambus contaminellus* flew at dusk; *Aspilates citraria* was not scarce, at rest on the grasses after dusk, and *Eubolia lineolata* abounded everywhere. We took a series of *Odontia dentalis* among the *Echium* (at the flowers of which *Macroglossa stellatarum* was common), but it was scarce and local, as also was *Melia anella* obtained by assiduous searching at the roots of the marram grass. Along the dyke sides a few *Lithosia complana* and *Acidalia emutaria* turned up, but we were too late for the latter. *Schœnobius forficellus* and *Cœnobia rufa* were abundant, and gigantic ♀ *Oaonestis potatoria* occasionally sailed over the *Typha* in company with *Leucania impura*. *Eudorea pallida* was not scarce, and a few *E. lineolalis* were knocked out of old hawthorns by the beating-stick. *Cledeobia angustalis*, *Herbula cespitalis*, *Crambus geniculellus* and *C. warringtonellus*, although occurring freely, were not in such profusion as usual.

On the Downs, etc., in the vicinity of St. Margaret's Bay, numerous species were obtained, among them *Lithosia griseola*, *Gnophos obscurata*, *Strenia clathrata*, *Aspilates gilvaria*, *Eupithecia pimpinellata*, *E. subfulvata*, *Melanippe galiata*, *M. rivata*, *Scotosia dubitata*, *Cidaria pyraliata*, *Eremobia ochroleuca*, *Heliothis marginata*, *Pyralis costalis*, *P. glaucinalis* (common in haystacks), *Eudorea cembralis*, *E. ingratella*, *C. angustalis*, *Homœosoma sinuella*, *Phycis adornatella*, *Oncocera ahenella*, *Melia sociella*, *Tortrix icterana*, *Peronea aspersana*, *Dictyopteryx holmiana*, *Penthina sellana*, *Sericoris cespitana*, *Euchromia striana*, *Sciaphila nubilana*, *S. perterana*, *S. pasivana*, *Sphaleroptera ictericana*, *Phoxopteryx comptana*, *Grapholitha nigromaculana*, *Catoptria cæcana*, *Ephippiphora trigeminana*, *Semasia rufillana*, *Stigmonota leplastriana*, *S. composana*, *Dichrorhampha politana*, *D. plumbagana*, *D. acuminatana*, *Catoptria microgrammana* (?), *C. fulvana*, *C. scopoliana*, *C. cana*, *C. citrana* (1), *Aphelia osseana*, *Eupœcilia hybridellana*, *Chrosis tesserana*, *Argyrolepia zephyrana*, *Conchylis francillana*, and *C. gigantana* in more or less abundance. The larvæ and pupæ of *C. gigantana* we collected in plenty in the seedheads of *Centaurea scabiosa*.

Of the Tineina I will leave Mr. Tutt to speak, as he is far more at home among them.

Other larvæ were scarce, with the exception of *Halias chlorana*, which were abundant, and a few *Peronea hastiana*, *Smerinthus ocellatus*, etc., all in osier.—Charles Fenn, Eversden House, Burnt Ash Hill, Lee. *September 9th*, 1890.

Swansea.—On June 11th, I went down to Swansea, hoping to do great things among the coast species, but was grievously disappointed, as, owing to the incessant rain, I was only able to sugar some half-dozen times on the sandhills during my stay there, and then nothing came freely to the bait. The L. and N. W. Railway runs along the sandhills, between Swansea Bay and Mumbles Road Stations, there being wooden railings on each side, the posts of which I sugared for half a mile or so, but my entire bag consisted of about half a dozen each of *Agrotis ripæ*, *Leucania littoralis*, and a few *Mamestra albicolon*, *A. tritici*, *Viminia rumicis* and *Miana furuncula*; these being all the NOCTUÆ I turned up there, excepting one *A. præcox*, which was taken by shaking the crests of the sandrush, growing in profusion there. GEOMETRÆ were a little more plentiful, *Eubolia lineolata* and *Cidaria fulvata* being very common among the *Galium* and sandroses, with an occasional *Melanippe galiata* and *Epione apiciaria*, a rather extraordinary place for the latter, as I observed no willow or nut near, and have never heard of them feeding on poplar[1] (which occurs there), although Merrin gives it as a foodplant. *Larentia didymata* simply swarmed along a ditch close by, and appeared to me to be darker than those I took in Hampshire two years ago. I managed to find time, amid brief intervals of sunshine, to make two or three excursions inland, and came across *Zygæna trifolii* and *Z. filipendulæ* in the same field, which was a boggy sort of place, and which I am afraid will be overrun next year, as a colliery has started thirty or forty yards off. *Acidalia immutata* also occurred in the same place, but all were more or less worn or faded, though oddly enough the ♂'s of *Z. trifolii* were in moderately good condition, while the ♀'s were decidedly *passée*, which I think is reversing the general order of things, as I always fancied the ♂'s emerged first. I managed to get some ova, and have some larvæ still feeding, though I doubt whether I shall be able to get them over the winter. Never having tried rearing that species before, I should be very much obliged to any one who has, who could give me a few wrinkles on the subject. The railway banks between Killay and Gowerton Stations yielded *Emmelesia albulata*, *Euclidia mi*, *Asthena luteata*, *Eubolia palumbaria*, and the black form of *Ypsipetes elutata* (bilberry-fed, I think it is called) on the wing, and *Viminia rumicis* at rest on posts. At Penllergare, which is about five miles from Swansea (inland), I took a few *Hydrelia unca*, which were rather worn, on June 14th, and in the same condition (rather better if anything) on July 21st, there being a succession of emergences, I presume, as I am told there is a second brood in September. It is rather a difficult thing to get them, owing to the nature of the ground where they occur, as you sometimes find yourself deposited in a ditch in following them up. They start out of the sedge, fly for twenty yards or so, and then down again; so keeping your eye on the spot where they alight, you cannot see where you are walking. I also got *Argynnis selene*, *Phytometra ænea*, *A. remutata*, and a few larvæ of *Clostera reclusa*, which, I believe, has not been turned up there before. I netted one specimen of the bee-beetle, which hovers over flowers (preparatory to alighting) like *Macroglossa bombyliformis*. On rhododendrons, about a mile and a half from the sandhills, I took over a dozen *Chærocampa porcellus*, 2 *C. elpenor*, and 1 *Plusia pulchrina*, also a few *Herminia tarsipennalis*; sugar in the same place produced 1 *Thyatira batis*, 1 *T. derasa*, *Hadena pisi*, *H. thalassina*, *Xylophasia rurea*, and 1 *Grammesia trilinea* var. *bilinea*, while *Hydræcia nictitans* and *Noctua umbrosa* came to the flowering seed-heads of the leek. I got *Bryophila perla* on walls, but only a few. Nothing whatever came to the lamps, which in '87 yielded *Orgyia pudibunda*, *Odontopera bidentata*, *Smerinthus populi*, and many other common things, and 3 *Notodonta dodonæa ;* also *Cucullia umbratica* at rest on tent pegs in morning, being attracted apparently by the aforesaid lamps, which ran along the bottom of our camp. I tried beating for larvæ on two or three occasions, but only got 1 *N. dictæa* off poplar on July 18th, which emerged on August 12th, and unfortunately turned out a cripple. I also got a few larvæ of *Eupithecia pulchellata* in foxglove. On the whole I think I did very badly, and hope to do better there next year, especially as I now have some idea of the various localities where things are to be found.—R.B. ROBERTSON, Fleet, Hants. *September*, 1890.

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[1] We get more from poplar than willow at Deal.—ED.

Perthshire.—From July 26th to August 9th, I was staying at the Pitlochrie Hydropathic, Perthshire, and found insects fairly plentiful. By far the commonest butterfly was *Erebia blandina*, which did not put in an appearance till August 1st, but then literally swarmed in several localities, more especially in a copse at the back of the Hydropathic, where it was a common occurrence to get four or five specimens in the net at one stroke. They were also common in the pass of Killiecrankie, Glen Tilt and on the Dunkeld Road, but the males everywhere predominated, only three females being seen. *Lycæna icarus* was also very common everywhere, the females being very large and brilliant; but *L. artaxerxes* was rather scarce, only a dozen specimens being taken, and these restricted to two very small localities. On Ben Vrackie (about three miles from Pitlochrie) *Cœnonympha davus* was very plentiful, but only in one place, at an elevation of about 1,000 feet. Here also were *Argynnis selene* and *A. aglaia* in abundance, both in lovely condition, the females of the latter all being very large and dark. On the heath here, also, were to be found in sheltered positions *Saturnia carpini* and *Bombyx rubi* (very small), the former being much smaller than those found at Brockenhurst a fortnight earlier. Among the moths taken on Ben Vrackie were *Eubolia mensuraria* (*very* dark), *Larentia cæsiata* (some almost black), *Emmelesia ericetata*, *Coremia munitata* and *Plusia interrogationis*. *L. cæsiata* was occasionally kicked up from the heath, but was usually found at rest on small pieces of rock. On one such piece, about a couple of feet square, I counted 14 specimens. Among some pines just beyond the village of Moulvie were found *Cidaria russata*, *C. immanata* and *Thera obeliscata*, all very common. The only other insects worth mentioning were *Larentia olivata* (common) and *Geometra papilionaria* (one specimen at light). I was prevented from doing any night work, or else, probably, the list would have been larger.—R. E. JAMES, Chesterville, Hornsey Lane, N. *August* 18*th*, 1890.

Hampstead.—Referring to the capture of *Apamea ophiogramma* at Hampstead (*Record*, 159), I may add that a second specimen of this species was taken in the same place by my friend Mr. E. H. Evans, the captor of the specimen already recorded. The insects were taken on the 23rd of June and the 12th of August respectively.—HENRY A. HILL, 132 Haverstock Hill, N.W. *September*, 1890.

Folkestone.—On August 30th, I ran down to Folkestone (accompanied by my friend Mr. Lowrey) for a *Colias* hunt. The weather was everything that could be desired, and we immediately turned in the direction of Shorncliffe along the Downs. We had not gone far before we were struck by the remarkable scarcity of *Rhopalocera*. The first species to attract our attention were a worn specimen of *Vanessa cardui* and a few *Melanargia galatea*, which of course were also very worn. By this time we had arrived at a large field of clover, where I had last year captured *C. edusa*, but on this occasion could not see either of the three. *Argynnis aglaia* was still represented by a few worn females. *V. polychloros*, one specimen, and one or two *V. io* were all that had come to our nets. Continuing our walk and passing along another clover field, Mr. Lowrey suddenly sighted a *Colias*, and calling to me (being the nearer), I gave chase, and had the pleasure of capturing a fine *hyale* ♂. The day had now considerably advanced, and although we kept well to the clover, this was the only specimen seen. The only other *Rhopalocera* to be found were *Pararge megæra*, *Lycæna icarus* and *corydon*, and also a few worn *L. bellargus* which rather took us by surprise as generally *bellargus* can be taken fresh quite late in September.—Joseph H. Carpenter, Johnson Villa, Streatham, S.W. *September* 18*th*, 1890.

Chatham.—A visit to Holly Hill by way of Snodland, accompanied by three friends, on the 26th of May, was the commencement of operations this year. On the wing we found *Argynnis euphrosyne*, *Syrichthus alveolus*, *Thanaos tages*, *Euchlöe cardamines*, *Gonepteryx rhamni*, and *Thecla rubi*; but, as yet, no *Lycæna alsus*. On the return home, in a quarry pit we found *Euchelia jacobææ* and several small species. Subsequent visits to this locality gave *Anaitis plagiata* in plenty, but worn, whilst *Eubolia bipunctata* abounded. Early in June, I captured *Chelonia plantaginis*, *Arctia villica*, *Scoria dealbata*, and others, near Strood. On the 6th of that month, on the way to Queensdown Warren, I captured a few *Abraxas ulmata*; *Lycæna adonis*, *L. alexis* and *L. argiolus* occurring sparingly in the Warren. On July 16th, going by train to Faversham, I explored Boughton Woods, but took nothing worth noting. During July and August I captured a large number of *Arge galatea*, a pretty golden-coloured var. of *Satyrus janira*, and some numbers of *S. hyperanthus*, varying much in the spotting. A visit to Holly Hill on August 1st produced *Lycæna ægon*, *Argynnis aglaia*, *Lycæna alexis*, *Acidalia bisetata* and *Aspilates citraria*. On the 6th of September I visited a new locality and found *Lycæna adonis* plentiful, with some bronzy looking varieties. The season, within a radius of eight miles round Chatham, has been a bad one. Many of the common species such as *Vanessa io*, *V. atalanta*, *V. cardui* and others having been entirely absent.—J. Tyrer, Jeffery Street, New Brompton, Kent. *September*, 1890.

Lyndhurst.—I arrived at Lyndhurst on July 6th, and worked in the neighbourhood until the 26th of the same month. The weather during my stay was decidedly bad, not more than seven days being really fine, and consequently the lepidoptera were very scarce except a few exceedingly common species. On inquiry I found that *Argynnis paphia* had not been seen, and *Limenitis sibylla* was only just coming out. I was also told that very few larvæ of *Thecla quercus* had been taken. However, I was not discouraged, for such reports are always prevalent, and I determined to work for what was to be got. The following is a list of my captures:—*Argynnis selene*, common, and still in fairly good condition. The females deposited a quantity of ova, from which larvæ are now feeding. *A. aglaia*, sparingly, in meadows and open places near woods. *A. adippe*, not uncommon on bramble and thistle flowers, but not in very good condition; I obtained one very pretty variety, in which all the silver spots on the under side are more or less diffused with blue. *A. paphia*, gradually becoming more common as July advanced: the females were not well out when I left, and I only took one specimen of the var. *valezina*. *Vanessa urticæ*, one or two examples at thistle flowers. *Limenitis sibylla*, fairly common towards the middle of the month, though not easy to get in good condition. I met an entomologist just after he had taken the black variety! *Apatura iris* was heard of several times during my stay. *Arge galatea*, local and uncommon. *Pararge ægeria*, examples of the vernal brood[1] were still flitting about, many of them being almost unrecognisable. *Satyrus semele*, a few males at Stubby Copse. *Epinephele janira*, this species was of course in full force everywhere, whether fine or wet; I took one small male, rather smaller than a typical *tithonus;* I also took many examples in which the wings were partially, and in some cases wholly, bleached. *E. tithonus*, just emerging towards the latter end of my stay. *E. hyperanthus*, common in wood rides and among bracken. *Cænonympha pamphilus* was abundant everywhere. *Thecla quercus*, one specimen only seen. *Lycæna ægon* was in large numbers on all the heaths, and to be boxed easily at dusk. *L. alexis*, common, but not so plentiful as *L. ægon*. *Hesperia linea* and *sylvanus*, at flowers in meadows, etc. *Zygæna trifolii* was exceedingly local, and only occurred very sparingly. *Z. filipendulæ* was not common. *Calligenia miniata*, rather local, but common in its habitat at dusk. *Lithosia mesomella*, not uncommon near woods. *Nemeophila russula* was abundant on the heaths, but had to be kicked out. I took four females, from which I obtained a quantity of ova. *Hepialus hectus* was common at dusk, hovering over bushes, etc., like a pendulum. *Odonestris potatoria*, one ♂ at light. *Platypteryx falcula*, one example beaten from birch. *Stauropus fagi*, one specimen was taken by a friend. *Leucania impura* and *L. pallens* were common at dusk at Matley Bog. *Agrotis porphyrea* was to be taken commonly flying over the heath at dusk, or settled on the flowers after. *Anarta myrtilli* was fairly common on the heath, and in good condition. *Phytometra ænea* was common in similar situations. *Acronycta* (*Cuspidia*) *tridens*, by day on tree trunks. *Thyatira batis*, one specimen at dusk, over brambles. *Uropteryx sambucata* and *Metrocampa margaritata* were common in wood rides at dusk. *Ellopia fasciaria*, to be beaten out of pines by day, or taken flying at dusk. *Pericallia syringaria*, not uncommon. *Selenia illustraria* var. *delunaria*, two specimens at Matley. *Acidalia emarginata*, rather uncommon. *Acidalia bisetata* was local, though common in its habitat at dusk. *Cleora lichenaria*, one specimen on a fence. *Boarmia repandata*, common at dusk; this species seems to be fond of the flowers of the foxglove (*Digitalis purpurea*). *B. roboraria* one specimen seen. *Pseudoterpna cytisaria*, commonly kicked up on the heath. *Geometra papilionaria*, one specimen at Matley Bog. *Phorodesma*

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[1] The vernal brood of this species is out in April, and another brood in June and *July, a third in* August or September.—Ed.

bajularia, probably common, though only two examples were taken, on account of the high flying habits of this species. *Hemithea thymiaria* was common at dusk. *Ephyra trilinearia* was not uncommon among beech. *Cabera exanthemaria* and *C. pusaria*, common in wood rides at dusk. *Macaria alternata*, one specimen in a pine wood. *M. liturata*, common in pine woods. *Bupalus piniaria*, still about, though mostly worn. *Lomaspilis marginata*, one specimen at dusk. Of the *Eupithecia*, *linariata*, *sobrinata*, *vulgata*, *centaureata*, and *coronata* were to be taken on fences. *Thera firmata*, one specimen amongst pines. *Melanthia ocellata* and *Melanippe montanata* were common at dusk. *Cidaria fulvata*, occasionally amongst dog rose. *Pelurga comitata*, one specimen at light. *Eubolia palumbaria* and *E. mensuraria* were both common, the former on the heath, the latter in grassy openings of woods. *Ypsipetes elutata* was very common, by day and night, and one or two nice varieties were taken. *Hyria auroraria* was not uncommon on the heaths.

It will be seen that the great blank in the foregoing list is in the NOCTUÆ, and this is on account of the absolute failure of sugar—indeed, I have seen only one insect on sugar this year. What the cause of this failure is I am at a loss to explain, for it is not only in this one district that it does not answer, but wherever I make inquiries it is always, "Sugar is not a bit of good." It is not, I would venture to say, because there are no NOCTUÆ about, for I saw plenty of common species, such as *Triphæna pronuba*, *Cosmia trapezina*, *Xylophasia polyodon*, etc., on the wing; but even they did not come to the bait. Neither is it solely on account of the attractive power of lime bloom, for it was a similar state of things before that tree flowered. Sugar failing, our night work then was confined to dusking and attracting what species we could to light, but even by these means we did not take anything like the number of species that we ought to have taken.

One day each was devoted to working for *Hesperia lineola* and *Zygæna meliloti*, but both expeditions were failures. Larvæ, too, were very scarce. *Gonepteryx rhamni* was common on the buckthorns, and *Saturnia carpini*, *Bombyx rubi*, *Anarta myrtilli*, and *Cidaria testata* were to be swept out on the heath. A friend told us that where he had taken as many as sixty larvæ of *Asphalia ridens* in 1888, there was not a single one this year!

On the whole, I must say that though I am very glad of those insects that I did take, I think this season must rank far below the average.—JAMES A. SIMES, 4 Cricketfield Road, Lower Clapton, N.E.

Isle of Man.—I sugared nightly in the woods at Tromode near Douglas, from the 18th to the 21st of June this year; but only took two *Triphæna pronuba*, and one *Agrotis exclamationis*. The nights were mild, with a warm breeze blowing. At the same place, the previous year, and on the same dates, insects simply swarmed. Although sugaring has proved a failure here this year, the season proved an exceptionally good one for *Dianthœcia cæsia* and *D. capsophila*. Of these insects, I took a number of fine specimens. *Cirrhœdia xerampelina* did not appear this August in profusion, to my knowledge only eight specimens were taken.—H. SHORTRIDGE CLARKE, 2, Osborne Terrace, Douglas, Isle of Man. *October 4th*, 1890.

Essex.—On the August Bank Holiday this year, I made an excursion to the Essex salt-marshes, where I took *Hesperia lineola* in some abundance. I found it flying with *H. linea*, although the latter appeared to be less abundant. The time was really too late, as I found many quite worn and useless. It appears the species prefers marsh-land, but it evidently occurs elsewhere, as a friend of mine had some that he took at Felstead, where there is no marsh, when at school, thirty years ago, and has had them in his cabinet labelled as *H. linea.*—A. W. MERA, Forest Gate. *October 13th,* 1890.

Reading.—Sugaring is still of little use. *Noctua rhomboidea* is the only species which has visited the bait in fair numbers, and these were mostly worn. Larvæ of *Heliothis marginatus* may be obtained plentifully just now, by sweeping *Ononis* after dark. *Xanthia citrago* are now emerging from larvæ collected in May from spun-together leaves of lime. These larvæ are easily seen between the leaves against the sky. They seem to stick to their tents in the day but come out at night to feed, and may then be beaten into the Bignell from lime, and sometimes from nut. They are best found young, for when nearly full-fed they appear to be more independent and wander about in the day. When full-fed, they lie dormant for six or eight weeks before pupating. Can anyone tell me the foodplant of *Pionea stramentalis*, and when would be the best time to search for it, autumn or spring?—W. HOLLAND, Reading. *September 3rd,* 1890.

Babbicombe.—I have just returned from a bicycle trip to Babbicombe, where I found *Dysthymia luctuosa* common but mostly worn. I hoped to find *Leucania putrescens* plentiful, but only took one specimen; the same remark applies to *Lithosia caniola.* Sugar was a complete failure, and after trying several nights I gave it up, made my way to Sidmouth, where I was informed *Hesperia actæon* was fairly common, and on to Brockenhurst. *Limenitis sibylla* has been comparatively scarce this year, and *Argynnis paphia* also. I went to the headquarters of *Catocala sponsa* and *C. promissa*, but sugared in vain.—W. DANNATT, Westcombe Park. *August 18th,* 1890.

Guernsey.—On reading Mr. Hodges' very graphic description of the "Habits of the larvæ of *Nonagria geminipuncta*" in the July No. of the *Record*, and having once captured a specimen of the perfect insect in Guernsey, I determined to search the reeds for pupæ. After a few hours' work I brought away about 20 reed stems each containing a pupa. I carefully removed the pupæ from the stems and placed them on damp moss, and had the satisfaction of breeding 15 moths, only one being crippled. The whole of them emerged from August 20th to 30th from 7 to 8 o'clock in the evening.

I have also captured about 20 specimens of *Eubolia peribolata* this season; the first capture being made on August 30th. They occur in furze brakes at the top of the cliffs, are very local, and might be easily overlooked, as you have to get in amongst the furze bushes where they are thickest, regardless of the pain caused by the furze thorns sticking into your limbs.—W. A. LUFF 12, Mansell Street, Guernsey.

NOTES OF THE SEASON (COLEOPTERA).—*Farnham.*—During the early part of August, I paid a visit to my old locality, Farnham, Surrey. I seldom fail in getting something in this district to add to my collection; but the weather was decidedly against me on this occasion, and beyond netting a couple of *Cicindela sylvatica* close to North Camp Railway Station, Aldershot, I did very little. *Cryptocephalus minutus* was fairly common on the heath, and *Coccinellidæ* were decidedly scarce. Even in the hop plantations the larvæ, or "serpents" as they are locally termed, were not plentiful; and in many places I found only two to a single pole, although the "fly" (*Phorodon humuli*) appeared in such quantities as to give no hope of any hop-crop whatever. The only species I could find on the hop-plants being *Coccinella bipunctata*, *C.* 7-*punctata* and *C. variabilis.* In the fir plantations *C. oblongo-guttata* was not abundant, but could be had by working for; *C.* 18-*guttata* was prevalent on the Scotch firs; *C. ocellata* seemed backward, indeed I generally take more of this species later and earlier in the year. *C.* 14-*punctata* is generally a common insect at Farnham, but the perfect form was entirely absent, although I met with a few of its larvæ. Other *Coccinella* species were also uncommon, and the reason of their scarcity is attributed by the planters to the heavy rains which appear to have washed the larvæ away. At Moor Park I turned up several *Cionus scrophulariæ* and *C. blatteriæ*, but not in such numbers as formerly, as the undergrowth has been cut and large quantities destroyed. My holiday here was of short duration, and, as previously mentioned, nothing of importance came to my net. *West Wickham.*—On August 16th, I went to see my old friend, Mr. W. Chaney, and we proceeded to West Wickham woods in the bright weather for an afternoon's sport. On the road, I picked up a stray chafer (*Rhizotrogus solstitialis*); this chafer is common at Hampstead, and also in many parts of Kent and Surrey. In the woods, I obtained *Cryptocephalus pusillus*, *Rhynchites nanus* and *Cœliodes rubicundus* (commonly), three species of *Orchestes*, and, sitting on the flower of the yellow ragwort (*Senecio jacobææ*), I found a nice male specimen of *Strangalia* 4-*fasciata.* This last was a good capture, and I was very pleased to get it. Among the odd insects which came into the umbrella was a specimen of the curious Homopteron, *Ledra aurita*; this I obtained from birch. I also captured two long-legged Hemiptera, and handed them over to Mr. Chaney. This trip was one of the pleasantest I have experienced during the season. *Islington.*—On August 26th, while sitting at supper, I saw a beetle running quickly across the room. I went for it and found it to be a fine specimen of *Sphodrus leucophthalmus.* This insect is supposed to be common in the "London District," but I do not know a single person who can procure a specimen by simply searching for it. My friend, Mr. Thompson, of Regent's Park, adopted the plan of leaving a small light burning in his cellar, then going down and suddenly turning on the full glare; in this way he captured three specimens last year, but this season I have not received one from him.—G. A. LEWCOCK, 73, Oxford Road, Islington.

PERONEA PERPLEXANA, Barr. AT ARMAGH.—In August and September, 1889, I took a number of this species here. I obtained it along with others of the same genus by beating the hedges in the afternoon. The moths thus disturbed fly out and are captured, but they need considerable quickness both of eye and hand, as they dart down to the ground and hide at the roots of the herbage, or else make their way back into the hedge, from whence it is not always easy to dislodge them a second time. They are mostly among hawthorn, but I have beaten them out of hedges formed of a mixture of blackthorn and bramble. I hoped to have got their larvæ or pupæ this season, but failed to do so. The moths are here, however, for I have taken a good many since the 26th August. They appear at the end of August, and last for about three weeks.—W. F. JOHNSON, Armagh. *September 5th*, 1890.

LEUCANIA VITELLINA IN THE ISLE OF WIGHT.—On Friday night, the 26th ult., I was fortunate in securing a specimen of the above rarity at sugar on a fence at my usual working ground in the Isle of Wight. The night was unfavourable, being very light, owing to an almost full moon, with very high wind and a few clouds. There were hardly any other moths on my whole round, even the commonest being absent, I saw one *Agrotis saucia*, the only one I have seen this autumn, but this was too sharp for me to be able to box. The most notable absentee in my experience, has been *A. suffusa*, which usually swarms, but of which I have only seen two or three specimens this autumn.—ALBERT J. HODGES, 2 Highbury Place, N. *October 2nd*, 1890.

NOTE ON PHOXOPTERYX OBTUSANA, Haw.—This pretty little Tortrix seems to be somewhat spasmodic in its appearance here; probably it is so in other localities. At the end of May and early in June, 1888, I observed it to be rather common in one restricted spot, flying freely in the early evening sunshine around a few oak-trees, and from these trees, specimens might also be beaten during the day. Previously, the few specimens I took annually were invariably associated with sallow, and, once or twice, specimens *in cop.* were actually obtained by beating sallow. This season, *P. obtusana* has once again occurred freely near its old habitat, but, strange to say, every one of the fifty or sixty specimens taken were flying around or beaten from young birch-trees. Its larva has, I believe, not yet been discovered, and its probable pabulum is, not without reason, a puzzle to me. Perhaps when its life-history is elucidated, its larva may prove to be a general tree-feeder, or, as is not at all unlikely, it may feed upon some low plant.—E. A. ATMORE. *September 26th*, 1890.

ACRONYCTA (VIMINIA) AURICOMA NEAR CHATHAM.—Some years ago, my friend, Mr. Chaney, and I took a considerable number of this species, most of which were given to Dr. Allchin. Probably we took more in 1859 than any other year, but all my dates are in July, and I never saw any sign of the species in any other month.[1]—J. TYRER, Jeffery Street, New Brompton, Kent.

INSECTS AT RASPBERRY BLOSSOMS.—I would advise careful attention to raspberry canes when in blossom. Some time ago I was in the walled garden of a Scotch "lodge" where the raspberries were in full blossom and the flower-beds edged with blue pansies. Moths came to these two attractions in astonishing numbers. The low growing flowers were thronged with *Plusia chrysitis*, while almost every blossom on the fruit bushes had its *P. bractea*, *festucæ*, *iota*, or *pulchrina*. Other common species were of course present.—LESTER ARNOLD. *Oct.* 1890.

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[1] This would agree with the second brood. I believe Mr. Tugwell has taken this second brood near Hailsham, Sussex, and I know that in the same locality, May is considered the month for the first brood by the Brighton collectors.—ED.

DIFFERENCES BETWEEN CHEIMATOBIA BOREATA AND C. BRUMATA.—*C. boreata* differs from *brumata* in many respects. The colour has never that decided brown tint we see in *brumata*, but shades off to olive or blackish. The size is greater, and the form when expanded is more triangular in *boreata* than in *brumata*. The hind wings are paler, and this is so apparent when resting with wings raised above the back, that they are separated at a glance; in fact, the whole insect is much lighter. The wings of the ♀ *boreata* are double the size of those of *brumata*.—C. FENN, Burnt Ash Hill, S.E. *Oct. 9th*, 1890.

LARVA OF CHEIMATOBIA BOREATA.—I have found that my larvæ of the above differ from those of *C. brumata* in three distinct ways, being larger, head black, and black spiracles, and feeding upon birch principally, but not exclusively.—A. E. HALL, Sheffield. *Oct. 26th*, 1890.

HYBERNATING LARVÆ.—Following the Rev. G. M. A. Hewett's suggestion as to the desirability of accumulating notes on the various methods by which hybernating larvæ may be successfully wintered. I venture the following:—

Bombyx quercus.—I had about forty ova of this species, in August, 1886, and the young larvæ on hatching, were immediately given bramble, on which they fed steadily till about the middle of November, when they were about as large as full-grown *B. neustria* larvæ. By picking the bramble in shady spots, one is enabled to find green leaves for the larvæ throughout the winter. In cold weather they remained on the stalks of their foodplant motionless, but on warmer days would sluggishly feed. Mine were kept in a roomy cage in an attic. By about the end of April of the next year, the larvæ started feeding again in earnest, and were easily reared, not one having died during the winter.

I have, at present, young larvæ of *Triphæna fimbria* and *Larentia olivata*, and should be very glad of any hints regarding their management.—R. M. PRIDEAUX, 9, Vyvyan Terrace, Clifton, Bristol.

RESULTS OF BREEDING, 1890.—*Lasiocampa quercifolia* (*Record*, p. 133) came out well, but larvæ of *Mamestra albicolon* died young. A fair lot of *Bombyx trifolii* were all stung; four *Luperina cespitis* only, out of thirteen, have emerged, and I have only eight pupæ out of a whole brood of *Hadena genistæ*.—G. M. A. HEWETT, Winchester. *September 5th*, 1890.

I had a large number of larvæ of *Hadena genistæ*, and they fed up in a most exemplary fashion. When full-fed, however, they began wandering about the breeding cage, and finally suspended themselves by one clasper to the side of the box and died. From eighty apparently healthy larvæ I have not obtained a single pupa. Mr. Tye, of Birmingham, informs me he has often tried to rear *H. glauca*, but they have all died in the same manner as my *H. genistæ*. The genus *Hadena*, perhaps, requires special treatment.—M. KIMBER, Newbury. *October 14th*, 1890.

Hadena genistæ appears to be a difficult species to get through properly; my experience coincides with Miss Kimber's in every respect, a grand batch of larvæ dying off in exactly the same manner. They were fed on knot grass, and I attributed my failure to the food. —O. C. GOLDTHWAITE, Leyton. *October 17th*, 1890.

PLUSIA FESTUCÆ NEAR BOLTON.—This species has been taken here for many years, formerly in great numbers, but has been so closely sought after of late that it is now comparatively rare. I am convinced that it is not double-brooded here. The larvæ hybernate when very young, beginning to feed again in April, as soon as the *Iris* makes its appearance. Emergence goes on for some time when the imagines once begin to appear. *Celæna haworthii* has been plentiful on our moors this September.—J. GRIME, 217, Halliwell Road, Bolton. *October*, 1890.

ABUNDANCE OF LARVÆ IN THE LONDON DISTRICT.—Around Brockley, I have found larvæ most abundant. Had I been so disposed, I could have taken hundreds of those of *Mamestra brassicæ*, *M. persicariæ*, *Pelurga comitata*, *Eupithecia subnotata*, *Hadena chenopodii*, *Mania typica*, *Arctia caia*, *A. lubricipeda*, *A. menthastri*, etc.—H. J. TURNER, 13, Drakefell Road, Hatcham, S.E. *October*, 1890.

AGROTIS PYROPHILA IN ABERDEENSHIRE.—I am glad to see that *Agrotis pyrophila* has occurred at Portland. I did not see Lieut. Brown's examples, but, as I have already got the species from him, I have been able to compare with Aberdeen ones, and I find the Portland *pyrophila* are generally larger, lighter in colour, and more distinctly marked than ours. A few, which I bred, are particularly darker. This species is distributed all over Aberdeenshire, and appeared in fair numbers this year. I get them at sugar, but more often at flowers:—the yellow iris, thistles, dock, reed, ragwort, and in gardens, sweet-william being particularly attractive. They need thorough searching, and, as the best localities are wild rough places, and dark windy nights are best, one has to be very careful. It is a most uncertain insect, some nights appearing in fair numbers, but generally, singly, and with miles between them. They have also an odd habit of crawling below bark and loose planks on palings and outhouses; in fact, immediately the light is put upon them, they make a dive to hide, if they are not too busy with the sweets. I placed about twenty under muslin upon growing plants, to try and get ova. Unfortunately, only one ♀ deposited, and then, only a very few ova. In my absence from home, my brother thought he could succeed where I had failed, and he obtained a few more ova, by the rough and ready method of squeezing their abdomens, and more curious still, all have hatched, and are feeding on dock and knot grass. The ovum is yellowish in colour when newly deposited, and about the size of and very similar to that of *Triphæna orbona*, but it gets dark before the larva emerges. The latter is dark green, very like that of *Noctua augur*, but more sluggish. If collectors were to search about the roots of grass, in the localities where the imago is to be got, I have no doubt they would turn up the larvæ. The best time, I think, is about the beginning of May, and the search must be conducted after dusk.—W. REID, Pitcaple, Aberdeen. *October, 1890.*

KEEPING RETINIA RESINANA THROUGH THE WINTER.—Mr. Horne, of Aberdeen, has sent me larvæ of this species, and probably many other lepidopterists have been similarly supplied. In the autumn of 1888, I had larvæ from Mr. Salvage. I placed the twigs in the garden, with no protection whatever, all the winter, and, in the following April or May, put them into a large empty flower pot, and tied a piece of calico over the top. Every larva pupated all right, and emerged in due course.—J. W. TUTT, Westcombe Hill, S.E. *November*, 1890.

CRAMBUS MYELLUS NEAR PITCAPLE.—A lad brought me specimens of this species, which he had captured near here, but they were all in poor condition. I am sending the best one (picked from those shown me) round in the Exhibition box. The species was not uncommon, flying in the afternoon.—W. REID, Pitcaple, Aberdeen. *October*, 1890.

CAPTURE OF MECYNA POLYGONALIS.—In June, 1885, I captured the enclosed specimen of *M. polygonalis* on a hillside near here. It has been in my cabinet ever since, as a var. of *Stenopteryx hybridalis.*—J. MASON, Clevedon Court Lodge, Somerset. *October* 1890. [This is an undoubted specimen of *M. polygonalis.*—ED.]

PHORODESMA SMARAGDARIA.—I have taken a few dozen *P. smaragdaria* larvæ on the Essex coast, where I also got one example of *Tortrix costana* var. *latiorana.* I have not heard of the capture of this var. for some time.—C. FENN, Lee, Kent. *September*, 1890. [Mr. Whittle took one at Shoeburyness this year.—ED.]

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*October 23rd*, 1890.—This was a slack meeting, very few exhibits being made. Mr. Bouttell exhibited two series of *Ennomos angularia*, one batch fed on elm, the other on sallow. Mr. Bright exhibited vars. of *Arctia caia*, and a series of *Triphœna subsequa* taken by Mr. Salvage in Forres. He also called attention to the report *re Vanessa milberti* (*Record*, p. 192), and again exhibited the specimen, which was compared with the Canadian *V. milberti* in the Society's collection, and proved to be identical. Mr. Adkin, a short series of *Tortrix piceana* from Surrey and Hants, and remarked on the length of time the species had been overlooked. Mr. Fenn stated that he believed the rarity of the species was due, in a great measure, to the habits of the larvæ. Mr. Joy exhibited *Plusia festucæ* from Cambs. Mr. Hawes, specimens of *Argynnis euphrosyne* showing variation in the quantity of black markings. Mr. Barker, specimens of *A. selene*, taken near Hastings, on August 29th and 30th, 1881. Mr. Tugwell, for Mr. Lachlan Gibb, specmens of *Colias* and *Pieris rapæ* from Canada. Mr. Cockerell, a specimen of *Myzine sexcincta*, and remarked that its hymenopterous appearance did not prevent its being eaten by birds; a cocoon of *Zygæna filipendulæ*, partly white and partly yellow, and remarked that cocoons were frequently entirely white or yellow, but rarely a combination of the two colours in one cocoon. He also remarked that Mons. Oberthür, in *Insect Life*, had recently written on dimorphism, and assumed that in sexually dimorphic species the ♀ departed from the type, and that in sexually dimorphic species a form of the ♀ ought to occur like the ♂, and instanced *Argynnis niphe*, which is generally distinctly sexually dimorphic, having produced a ♀ form at Trichonopoly similar to normal males.—Ed.

City of London Entomological and Natural History Society—*October* 16*th*.—Exhibits: Coleoptera—Mr. Beck, a Longicorn from India; a series of *Cicindela sylvatica* from Aldershot; *Dytiscus dimiatus* from the New Forest and several other species. Mr. Cripps, pupa-cases and perfect form of *Hypera fasciculata*, and red var. of *Lasia globosa*. Mr. Bryant, *Calosoma inquisitor*, *Silpha* 4-*punctata*, *Geotrupes pyrenæus*, and numerous other species from the New Forest. Lepidoptera:—Mr C. A. Briggs, varieties of *Abraxas grossulariata* from the London district. Mr. Lewcock, on behalf of Mr. Robson of Hartlepool, photographs of that gentleman's large series of the latter insect, also of *D. vinula*. Mr. Jäger, a fine series of *Callimorpha hera* and the *Chelonidæ*. Mr. Hollis, *Callimorpha hera*. Mr. Heasler, an example of *Deilephila euphorbiæ*, captured at light in Paris. Mr. Machin, a series of *Arctia mendica*, including specimens from Huddersfield and the south of England, also the Irish form. Mr. Smith, various species from Lyndhurst. Mr. J. A. Simes, a number of life-histories. The following species of *Tæniocampa* were exhibited. Mr. Bouttell, a series of *opima*, taken at Wanstead on grass stems near dwarf sallows in 1881 and 1882. Messrs. C. G. Barrett and J. A. Cooper made observations respecting the capture of the species in the south of England, and Mr. Fenn stated that the insect had also been taken at Lewes, Sussex. Mr. C. Fenn exhibited *populeti* from Lee. Mr. J. A. Cooper, *gothica* var. *gothicina* and *instabilis*. Mr. Mera, *opima* and *populeti*. Mr. Mason (of Somerset), long series of *munda*. Mr. Boden, the red form of *gracilis*. Mr. Bright, a fine series of the red form of *gracilis* from the New Forest. Messrs. A. J. Hodges, Clark and Tutt, their cabinet drawers containing the genus. Mr. Raine, *Tæniocampa* larvæ. Other exhibitors were Messrs. Battley, Hanes, Gurney, Milton, Nicholson, etc. Mr. J. W. Tutt opened the discussion and gave an outline of the genus, and its phases of variation. The following is a brief summary of his remarks:—

I. *Structure*. The genus *Tæniocampa* belongs to the Orthosiidæ and the species in the genus, although very closely related, are sufficiently distinct to give broad sub-divisions. The species *leucographa* and *rubricosa*, although very closely allied to each other, are very dissimilar to *hyperborea* (*alpina*), which seems to be an aberrant member of the *Agrotidæ*, and there appears no reason whatever for uniting these species in the genus *Pachnobia*. *Instabilis* and *opima* are also very closely allied, *populeti* superficially so, but structurally more closely allied to *stabilis*, whilst *munda* is perhaps, next to *opima*, more closely allied to *instabilis* than any other; *gracilis*, in its typical forms, appears to be fairly distinct, and although perhaps most closely allied to *stabilis*, its dark varieties run insensibly into the almost parallel forms of *instabilis*. *Gothica*, through var. *gothicina*, appears to be more closely related to *stabilis*, and, although its larva and structure are truly *Tæniocampid*, yet it has a remarkable superficial resemblance to the genus *Noctua*. *Miniosa* (probably the most specialised species) is, at the same time, the most aberrant member of the genus; its larva is *Tæniocampid*, and its relations are with *stabilis* and *cruda*, but having no very close connection, apparently, with either. The groups into which it appears advisable to divide the genus for the purpose of comparison are: (1). *Leucographa* and *rubricosa*; (2). *Munda*, *instabilis*, *opima*, *gothica*; (3). *Populeti*, *gracilis*, *stabilis*, *cruda*; (4). *Miniosa*. The relation of these groups to each other was fully discussed.

II. *Variation*. Taking the genus as a whole, we find very closely allied species, and should naturally look for parallel ranges of variation. The "origin of species" points out that this should be so, for if a slight modification and gradual development, owing to environment, etc., bring about specific distinction, it follows, that reversion and natural selection generally, will aid in the development of somewhat similar forms under similar conditions. The general variation was then considered under the following heads:—(1). Colour variation; (2). Variations in size, shape and position of stigmata; (3). Modifications of transverse lines (basal line, shade between stigmata, angulated dotted (or wavy) line beyond the reniform, and line parallel to hind margin; (4). Development of dots and wedge-shaped marks, parallel to hind margin. All these points were fully dealt with and illustrated by the various species, *T. instabilis*, as the most variable member of the group, being repeatedly taken as the basis on which the various arguments were worked out. Mr. Tutt then made a few remarks as to the effects of "Natural Selection" on the variation of the same species in different localities. Of the specimens of *instabilis* sent from Hereford, almost 50 per cent. were dark, whilst from Forres, of those sent not more than 2 per cent. were dark; but these specimens were picked, and probably the percentage given might be erroneous and misleading, as Mr. Tutt had worked neither district. The large amount of material needed for working up a subject like this fully, Mr. Tutt suggested, prevented many from taking up the study, and the material was not at hand in the Museum at South Kensington. The comparative inaccessibility of the scientific collection to ordinary workers was much to be deplored, although Mr. Tutt did not think the curators of the entomological department were in any way responsible. He could not help thinking that the collections might be made of more real service to British entomologists than they are at the present time. Mr. Tutt concluded by acknowledging his great indebtedness for material and suggestions to Dr. Chapman, who had supplied him most generously with specimens to work out the variation.

Mr. Fenn stated that from his experience of *T. miniosa*, he considered it closely allied to *cruda*, and that its resting position in nature, was very similar to that species. It also varied considerably. Dr. Buckell had observed that the TÆNIOCAMPIDÆ all emerged at about 10 o'clock a.m. Mr. Machin, Mr. C. G. Barrett, and others also took part in the discussion. Replying to Mr. Lewcock with respect to neuration, Mr. Tutt said it could not be depended on altogether, as it was unstable and very unreliable. Votes of thanks to Mr. Tutt and the country exhibitors were unanimously accorded.

November 6th.—Exhibits: Coleoptera—Mr. Boden, *Cicindela sylvatica*, *C. campestris*, *Lina populi*, *Toxotus meridianus*, *Cryptocephalus aureolus*, etc. Mr. Ellis, *Chrysomela banksii*, *Elaphrus riparius*, and several others from Herts. Mr. Lewcock, on behalf of Rev. J. Isabell, a box of Coleoptera, chiefly *Staphylinidæ*, from Cornwall. The rest of the evening was devoted to the discussion of the APAMIDÆ, in connection with which Messrs. Clark, Tutt, Nicholson, Battley, Dr. Sequeira, and others, exhibited specimens. Mr. Lewcock, on behalf of Mr. Collins of Warrington, also exhibited a box of specimens of the APAMIDÆ, taken by that gentleman in the Warrington district. Mr. Tutt stated that his remarks would be more in the style of "gossip" than "science," but he hoped that something might be learned from what he had to say. He then gave an outline of the genera in the family APAMIDÆ, and showed how certain species in some of these genera, were closely allied to other species in the genera of the family HADENIDÆ, although so widely separate on our list. In the genus *Hydræcia*, Mr. Tutt pointed out, in his fine series, the differences between *nictitans* (L.), and *paludis* (Tutt), and compared these species with *lucens* (Frr.), captured by Mr. Collins near Warrington. In *Xylophasia*—*rurea* was especially dealt with, and the range from var. *argentea* (Tutt), to var. *nigro-rubida* (Tutt) as exemplified in his long series, was fully illustrated, whilst a drawer showing the different vars. of *X. polyodon*, proved of great interest. The local vars. of *Heliophobus hispidus* were dealt with, followed by a criticism of the paper, published by Mr. South in the *Entomologist*, on *Luperina nickerlii*;—Mr. Tutt pointing out that Mr. South's paper, based on insufficient data, tended to be misleading as to the specific identity of the species, as Mr. Baxter's specimen was an undoubted var. of *L. testacea*, and agreed in no way with Freyer's original description of *nickerlii*. The genus *Mamestra* occupied some time—*abjecta* being referred to the *adusta* group of the genus *Hadena*. *Apamea* includes the most protean Noctuid (*didyma*) in the British fauna, and Mr. Tutt pointed out how strange it was that the two most nearly allied species to *didyma*—*unanimis* and *ophiogramma*—were so constant. Attention was then drawn to the apparently erroneous position of *leucostigma* (*fibrosa*) in *Apamea*, and its close resemblance to *Hydræcia*. *Miana furuncula*, as offering a good illustration of response to environment, was next considered, and was well illustrated by a splendid series of above 200 specimens in Mr. Tutt's cabinet. *M. fasciuncula* was a var. of *strigilis* without doubt. The Rev. W. F. Johnson had sent Mr. Tutt specimens perfectly intermediate, and equally well-named as either species. Notes on the rare species of the family, which proved most interesting, brought the remarks to a close. A discussion ensued, in which Messrs. Clark, Lewcock, Battley, Simes, and others took part, and the proceedings terminated with votes of thanks to Mr. Tutt and the country exhibitors. The President drew the attention of the members to the Pocket-Box Exhibition on November 20th.—G. A. LEWCOCK and A. U. BATTLEY, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON—*November 5th*, 1890.—The Right Hon. Lord Walsingham, M.A., F.R.S., President, in the chair. Lord Walsingham announced the death of Mr. Atkinson, of the Indian Museum, Calcutta. Mr. A. H. Jones exhibited a number of Lepidoptera collected in June last near Digne, Basses Alpes, including *Papilio alexanor*; *Parnassius apollo*, larger and paler than the Swiss form; *Anthocharis tagis* var. *bellezina*; *Leucophasia duponcheli*; *Thecla spini*; *Thecla ilicis* var. *cerri*; *Lycæna argiades* var. *corretas*; *L. bellargus* var. *ceronus*; *Melitæa deione*; and *Argynnis euphrosyne*. Mr. W. E. Nicholson also exhibited a collection of Lepidoptera, found near Digne last June, which included very large specimens of *Papilio machaon*; *P. podalirius*; *Thais rumina* var. *medesicaste*, larger and redder than the Mediterranean specimens; *Apatura ilia* var. *clytie*; *Argynnis adippe* var. *cleodoxa*; *A. daphne*; *Melanargia galatea* var. *leucomelas*; *Vanessa egea*, bred from pellitory; *Satyrus semele*, and many others. Mr. C. O. Waterhouse exhibited the wings of a large species of *Attacus*, split in halves longitudinally so as to show the upper and lower membranes. Dr. D. Sharp exhibited a photograph he had received from Professor Exner, of Vienna, showing the picture obtained at the back of the eye of *Lampyris splendidula*. He stated that this picture is continuous and not reversed, and shows the outlines of lights and shades of objects at a distance as well as of those closer to the eye. Mr. H. Goss exhibited a specimen of *Zygæna filipendulæ* var. *chrysanthemi*, which he had taken at Rhinefield, in the New Forest, on July 15th last. Dr. P. B. Mason said this variety was known on the Continent of Europe, and was figured by Hübner in his *Sammlung*, a copy of which work he exhibited. He added that he possessed a similar specimen of this variety taken in Wyre Forest, Worcestershire. Colonel Swinhoe stated that he possessed a similar variety of a species of *Syntomis*. The Rev. Dr. Walker exhibited a number of Diptera, Hymenoptera and Coleoptera recently collected in Iceland; also drawings illustrating the various forms of *Crymodes exulis* occurring in Iceland which he had shown at the October meeting of the Society; he also exhibited seven varieties of *Melanippe thuleana*, nine of *Coremia munitata*, and a few of *Noctua conflua*, illustrating the varied forms of these species occurring in Iceland. Dr. Mason said that the only British specimens of *N. conflua* which he had seen resembling the Iceland form of the species were taken at Wolsingham, Durham. Mons. A. Wailly exhibited and remarked on a number of Lepidoptera from Japan. The collection comprised about thirty species, eleven of which, it was stated, were not represented in the British Museum collections. Mr. A. C. Horner exhibited a number of rare species of Coleoptera, including *Homalota crassicornis*, Gyll., *H. humeralis*, Kr., and *Euryporus picipes*, Pk., collected at Church Stretton, Shropshire; and also specimens of *Amara nitida*, Sturm., *Oxypoda amæna*, Fair., *Homalota testacespes*, Heer, *Lithoceris apicalis*, Kr., and *Epuræa neglecta*, Heer, from the neighbourhood of Tonbridge. Mr. Meyer Darcis exhibited a specimen of *Termitobia physogastra*, Gangelb., a new genus and species of *Brachelytra* obtained in a white ants' nest. Dr. Sharp commented on the interesting nature of the exhibition. Colonel Swinhoe exhibited a collection of moths from Southern India, which comprised about forty species, distributed amongst the following families:—*Syntomidæ*, *Lithosiidæ*, *Arctiidæ*, *Lasiocampidæ*, *Zerenidæ*, *Fidonidæ*, *Leucanidæ*, *Heliothidæ*, *Acontiidæ*, *Poaphilidæ*, etc. He also read a paper describing these species, entitled "New Species of Moths from Southern India." The Rev. T. A. Marshall communicated a paper entitled "A Monograph of British Braconidæ. Part IV." Lord Walsingham read a paper entitled "African Micro-Lepidoptera." This paper contained descriptions of seventy-one new species, and of the following nine new genera, viz:—*Autochthonus*, *Scalidoma*, *Barbaroscaridia*, *Odites*, *Idiopteryx*, *Microthauma*, *Licmocera*, *Oxymachænis*, and *Micropostega*. Several European genera were recorded as new to the African fauna: and several American genera, one Australian, and one Indian genus were also recorded as represented in Africa.—H. Goss, *Hon. Sec.*

NOTICES, REVIEWS, Etc.

AN ILLUSTRATED HANDBOOK OF BRITISH DRAGON-FLIES. By W. Harcourt Bath. Published by E. W. Allen, 4 Ave Maria Lane, E.C.—A popular handbook in any branch of the science of Entomology, by means of which the collector can at once name the species which he collects, is sure to attract recruits to that particular branch, and from the number of those who commence as collectors, are obtained the few who become scientists, systematic or otherwise. Without attempting anything scientific, the above book gives a beginner sufficient help to name his captures pretty readily, and, thus far, will be useful to those for whom it is intended. Of those who commence in this way, many will soon get beyond the contents of a handbook, and with the elementary knowledge already obtained, can easily go on to the study of more advanced scientific text-books. The few British dragon-flies can so easily be collected with lepidoptera, that I shall be astonished if the publication of this book does not lead to an increase in the number of collectors of that beautiful group.—ED.

A HISTORY OF BRITISH LEPIDOPTERA, WITH COLOURED PLATES. By S. L. Mosley, F.E.S. Published by the Author, Beaumont Park Museum, Huddersfield. This work, of which Part 1 is to hand, should prove useful. There are six Plates to Part 1, and I would suggest, that although Plates i.-iv. are fairly well done, it would be advisable to reprint Plates v. and vi., as the ova, larvæ, and pupæ on these are excessively bad, and the imagines but little better. I notice on p. 6, that *Parnassius delius* is said to be very like *Pieris cratægi*. Surely this is not seriously meant. On the same page, the author appears to believe that insects are "blown over" from the Continent, and gives credence to the report that *P. apollo* was recently observed near Dover. Errors in the letterpress do not tend to improve the book, but this defect will probably disappear in the succeeding Parts. If the Plates are improved the book will probably find a ready sale.—ED.

THE ROCHESTER NATURALIST, VOL. I. Published by The Rochester Naturalists' Club. This volume of 506 pp., besides containing many articles of general interest to naturalists, has several devoted to lepidoptera, and a list of the Macro-Lepidoptera of the district, compiled by Mr. W. Chaney, will prove of the utmost use to all those lepidopterists who specially work the county of Kent. The volume is to be obtained from Mr. J. Hepworth, Union Street, Rochester.—ED.

The Entomologist's Record

AND

JOURNAL OF VARIATION.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 201.)

ACRONYCTA (*Viminia*) *rumicis*.—I have, to some extent, taken this species as the type of the subgenus *Viminia*, and used it for the purpose of comparing the others with, rather because it is the most abundant and easily obtained, and therefore the most convenient for the purpose, than because I have any decided opinion that it is a more ancient and primitive species than the others. The humps on the 5th and 12th segments of the full-grown larva of *rumicis* give it a peculiar outline, which is further pronounced by the attitude it assumes by laying its head prone and slightly raising the 5th segment off the surface on which it rests, I have called this the *rumicis* form or outline. This form is assumed in the earlier larval stages by all the other species of *Viminia*, but lost again by the full-grown larva. Curiously there is least of it in *venosa*, which in all other respects, egg, newly-hatched larva, and markings of full-grown larva and pupa is closer to *rumicis* than they. It is also perhaps remarkable that the outline of the larvæ of *psi*, *tridens*, and *strigosa* should be so strongly that of *rumicis*, though belonging to a widely different section of the genus, their newly-hatched larvæ (*psi* and *tridens* at least), also, have the same pale and dark segments as *Viminia*, so that it would not perhaps be safe to suppose that the *rumicis* outline has been assumed by them independently; but I am, nevertheless, inclined to regard the coincidence as due rather to a parallel variation in allied species, than to a common descent from an ancestor of *rumicis* form.

The egg (Plate VII., figs. 1 and 2), when first laid, is white or faintly greenish in tint, and soon becomes yellowish, it then gets streaks of red in a network, as if it were going to take the aspect of *alni* or *auricoma*; the streaks, however, become more numerous and suffused, there is a central red or brown dot on the apex surrounded with a pale zone, and the rest of the egg is finely dotted with yellow or orange dots on a reddish-brown base. This colouring is assumed in two days in warm weather, in cool weather not under a week is occupied in the progress of the change to full colour. When massed together, the eggs appear to have a black dot at the apex of each. They are laid in a regularly imbricated fashion, and have in mass the silky lustre already referred to. They are almost exactly 1 mm. in diameter and 0.32 mm. in height. They have about 54 ribs, of the same character as in the other species. In some lights the crenulations of the ribs have more of the appearance of rows of beads, but this is not due to any essential difference from the other species, which would probably present a similar aspect when favourably viewed.

The newly-hatched larva (Plate V., fig. 7) is pale, but very quickly the tubercles blacken, and when somewhat fed, or indeed at first, with sufficiently close observation, the segments present the typical pale and dark coloration characteristic of *Viminia* with the weak 11th segment of *Acronycta*. The pale segments have each tubercle surrounded by a white zone, the rest of the segment being pale rufous, the dark segments are brown, and the pale zones round the tubercles, in these, are rufous.

The anterior trapezoidals are large, with an angular hollow edge to fit the posterior trapezoidals; they have three strong hairs, and two, or even three, weaker ones: the hairs, as well as the tubercles, are nearly black. On the 11th segment, the tubercles are very small and the hairs short, but the anterior trapezoidals possess five hairs. The other tubercles have one hair each, on some posterior trapezoidals is a faint point as of a second hair.

The scutellum of the 2nd segment has three hairs on each half, and the second tubercle (supra spiracular ?) has two hairs. On the 3rd and 4th, the anterior trapezoidals have each three hairs. Unlike *venosa*, the larva, as it grows, shows the alternation of light and dark segments less distinctly.

In the 2nd skin, it appears to be black, but the skin is really dark brown; there are white areas around the trapezoidals of

3 and 4 and round the posterior trapezoidals of 6.7 and 11, and white or orange markings on the front portion of the 12th. Segment 5 is especially large and black, 11 is small and its tubercles dwarfed, 12 is decidedly humped. Below, the colour is pale brownish, as well as round the sub-spiracular tubercles. The hairs are long and black, from 6 to 12 on each tubercle, except the post-spiracular, which is barely visible. When full-fed in this skin, the colour is fuscous brown, and the white marks round the trapezoidals, now take the form of a series of orange-yellow spots and patches between the trapezoidals and surrounding the posterior trapezoidals, most marked on segment 3, especially as regards colour, next on 11, and are wanting on 5, 8 and 9. The markings round the sub-spiracular tubercles also form a series of yellow patches, amounting almost to a lateral line.

On entering the 3rd skin, the tubercles and hairs are so abundant and black, that nothing further can be detected, except the presence of a reddish lateral line, and that some pale markings exist, especially on 11, and also on 12 and 13. When fairly grown in 3rd skin, the length is 6–7 mm., it sits, when at rest, in typical *rumicis* attitude, head pressed flat, with jaws forward, dorsal surface rising thence rapidly to hump on 5th segment, then falling with a hollow sweep to 11, and rising suddenly to hump on 12. The hump on 5 is not yet distinct, and results merely from the largeness of the segment itself and its larger tubercles. On segment 12, the large tubercles rest on a surface higher than the general level. All the anterior trapezoidal tubercles are larger, they stand out in a pronounced manner, and give an angularity to the outline. An orange rufous area, forming a lateral band, surrounds the sub-spiracular tubercles; on 3 and 4 are white marks, between the dorsal tubercles; on 6 and 7 there is a white double line between the anterior and posterior trapezoidals; a similar marking forms a continuous line along 10, 11, and on to 12, and 11 has two dorsal white spots; 13 is paler than the rest of the larva.

In the 4th skin, the appearance is very much that of the full-grown larva, the 5th segment very large, tapering rapidly to the head; the *rumicis* form is, in fact, almost more pronounced here than in the full-grown larva—a parallel perhaps to the other *Viminiæ*, which have a *rumicis* outline in the 3rd and 4th skins, which they afterwards lose. The general colour is black, with two somewhat square white marks below and in front of the trapezoidals of 11 and 12, as somewhat conspicuous marks, and as part of a tendency to a white band in this position, which is again most evident in 3 and 4, 6 and 7, and partially in 9. There is also a row of dorsal red spots which tend to be red transverse lines in the incisions of the segments, decidedly so between 12 and 13, and less so on those in front. There is a broad red lateral line immediately above, but almost including the sub-spiracular tubercles. In a very few examples this line is nearly white towards the incisions (as in last skin). The post-spiracular tubercle is a mere dot; the other tubercles are black, carrying bundles of black bristles as long as the diameter of the larva. The tubercles on 5 and 12 are larger than the others, as the segments themselves are. On all the posterior trapezoidals are some white bristles, most pronounced on 6 and 7, also on 2.3 and 4. Beneath, the colour is paler, pale fuscous. There is some little variation in the markings, some specimens having the white spots from 6–12 very distinct, and with reddish and ochreous marblings, which coalesce into pale circles round the posterior trapezoidals of 6–11, and some of the supra-spiracular tubercles. The spiracles are inconspicuous.

On entering the 5th skin, the newly changed larva viewed dorsally looks like a black cross in a white setting, the dorsum is black and the 5th segment with its tubercles and hairs is also black, whilst the subdorsal hairs of 2.3.4 and 6 and onwards are whitish, and the white lozenges of 10.11 and 12 complete the white border towards the tail. As the larva grows, it becomes more like the full-grown larva, but retains the black and white aspect, as compared with the brown tone of the larva in the last skin. The lateral line also is yellowish towards the incisions. The posterior trapezoidal, and, to a less degree, the anterior, and the supra-spiracular tubercles have an abundance of plumose hairs, black on 5th segment but white (or pale ochreous) on the others, most abundant on 5 and 6 and diminishing thence in either direction so that 3 and 10 are almost without them; spiracles white with a conspicuous white dot in front of each; head black, with, in some specimens, an inverted V above the clypeus, brown.

In the last (6th) skin, the length is from 29 to 34 mm. When first moulted, hardly any markings are visible and the larva (especially the variety with red hairs on 5) might pass for *fuliginosa*. As the larva grows, the various markings appear and the familiar aspect is assumed—it seems unnecessary to transcribe my description of so well-known a larva, though it may be well to call attention to the marblings of the ground colour, which are of a similar character and disposition to those described under *venosa;* and the minute dotting, with hair points is the same. The larva varies little except in colour of hairs and in trifling details of markings, but its general aspect varies immensely according to how much it is fed up and according to its attitude. The front view, when a full-fed larva is drawn up in sulks is very bizarre, the head being surmounted by two white triangles pointing up to the brown and black hair tufts.

It happens however, that, I met with, last year (1889) at Llandudno, a remarkable variety of the full-grown larva. The ground colour was a light salmon with some darker marblings, the lateral line white, interrupted by the salmon-coloured subspiracular tubercle, some dark marks between the dorsal yellow dashes and subdorsal white marks. The spiracles white on a dark mark extending forward to the next incision. The hairs reddish salmon, the head black, with large lateral area reddish, and clypeus reddish with black centre. This larva produced a moth of the ordinary form—whether this was a rare example approaching an albino form, or whether the pale limestone of the Orme's Head, on which it was basking, has developed a local race of this coloration, I do not know.

The number of moults in *Acronycta* is five, but a number of the species do, upon occasion, reach the last skin in four moults, omitting the fifth skin; and where, as in *rumicis,* that skin has a special distinctive marking or coloration, or arrangement of the hairs, these larvæ never exhibit that particular phase. In *rumicis* this is by no means uncommon, most broods presenting some examples of it. I have also noted it in *menyanthidis*, *auricoma*, *leporina*, and *aceris,* and have no doubt it occurs, if more rarely, in all the others. This variation has no relation to sex. When I first met with it, I thought that it probably represented an attempt to press forward and get in another brood, to become double-brooded, but this also I found not to be the case, nor was there any difference in size in the full-grown larvæ or imagines. It seems to be a spontaneous variation, whose meaning and use have yet to be discovered. It is an interesting circumstance to note, in connection with this, that *alni* alone has four moults as the normal number, and that, in rare instances, it moults five times like the others. The light which these instances throw on the sudden change of the larval form and colouring, in moulting from the fourth to the last skin, must be more fully dealt with under that species.

Although the four-moult form has no relation to an attempt to reach the imago state more rapidly and to become double-brooded, nevertheless *rumicis* presents it more frequently than the other species and is also the one (after *auricoma*) that most frequently is double-brooded. In the south, there are always autumnal specimens, usually I think a second brood. In the north, there is no second brood and rarely if ever an autumnal specimen.

The pupa (Plate I., fig. 1.) is black (length 17 mm., width 5½mm.), the general outline is cylindrical, not only from the front to the end of the wing cases, but to the end of the next two (free) abdominal segments, the remaining (fused) segments taper rapidly, and except in plump pupæ, irresistibly suggest that they are a portion of a smaller pupa attached in place of the proper segments.

Ventrally, the coverings of the proboscis, first and second pairs of legs, antennæ and wings are more marked off from each other and distinct, than is usual in Noctua pupæ, and their surface, though, broadly speaking, smooth, is marked by numerous close transverse wrinkles, the tips of the third pair of legs also appear. Dorsally, the posterior edge of the mesothorax is very marked as if it were overhanging the next segment, the metathorax is not very distinctly separated from the 1st abdominal segment. The four abdominal segments, forming part of the solid portion of the pupa, and the two free ones (5 and 6) have a similar sculpturing, though less boldly on the first three than the others. The hind margin of each segment (Plate II., fig. 4b) is raised in smoothly rounded projecting ribs (*vimen*), whilst the rest of the segment, at least dorsally, is rough with very numerous raised and pointed dots and warts, most pronounced close up to the *vimen* and dorsally. The flexible membrane uniting the free segments is usually lighter than the rest of the pupa, dark or even pale brown, and is covered with very minute dots closely set in regular rows. The dorsal aspect of the 7th abdominal segment, the first of the solid terminal portion, has the warts of the preceding ones, but not the marginal rib—the remaining segments are nearly smooth. In the finest pupæ, the boldness of the "hoops" on 4th, 5th, and 6th abdominal segments gives an appearance of greater thickness here (an approach to *venosa*).

The anterior extremity of the pupa (Plate II., fig. 4a) is marked by two raised rough knobs, situated between the bases *of the antennæ*. The spiracles are in the usual position, viz., between the pro- and mesothorax, immediately behind the antenna case and on the 2nd, 3rd, 4th, 5th, 6th and 7th abdominal segments. The spiracle of the 1st abdominal segment is covered by the wings, and that of the 8th is seen as an obsolete mark on the 2nd segment of the terminal piece.

The anal extremity (Plate II., fig. 4c) is conical, but broader at the tip, and is slightly hollowed in front, like a very broad stubby pen. The armature consists at first sight of a dense brush of fine brown bristles, but this is often sufficiently rubbed off to show that the pupa itself has certain points or processes. The end resembling the stubby pen is a rectangular surface, not directly terminal, but facing somewhat dorsallyand armed at each corner with a blunt point, not sufficiently developed to be called a hook, but suggests that it is a rudimentary one. In some specimens, there is an indication of another pair placed between the two ventral ones, but additional dorsal ones are not sufficiently pronounced to be quite sure of. There are the usual pairs of minute bristles at the bases of the antennæ, on the outer side of the frontal tubercles, one on each side of the clypeus (?), a small group on each side of the back of the mesothorax, and some on each side of the back of the 12th and 13th segments, all these are barely more than microscopic.

I have already said, that the other *Viminia* pupæ differ from that of *rumicis*, only in the degree in which these several features are more or less pronounced. I find it convenient to describe the 5th and 6th abdominal segments as the "free segments," the rest being fixed or fused together in the thoracic and anal masses. I believe the Macros have, as a rule, only these two segments free in the pupal state. It is indeed only broken by a few genera such as *Trochilium*, *Hepialus*, *Zeuzera*, and *Cossus*, which, in several other respects (except size), have much affinity with the Micros.

As to its distribution, Stainton's classical expression in the *Manual*, of "Common everywhere," would still be applicable to *rumicis*, were it not that *rumicis*, like other species, is disappearing, or at least becoming very rare in the densely populated districts.

(*To be continued.*)

An excursus of Plate V. will be published next month.

ERRATA—P. 199, line 17, for "opening" read "spinning;" p. 194, line 13, for "mammellæ" read "mammillæ;" p. 194, line 5 from bottom, for "6th" read "1st."

EXPLANATION OF PLATE V.

LARVÆ OF ACRONYCTAS IN FIRST SKIN.

Fig. 1.—*Acronycta* (*Viminia*) *auricoma.* Larva in first skin fed a little × 20 diam.

Fig. 2.—*Acronycta* (*Viminia*) *auricoma.* Larva full fed in first skin × 12 diam.

Figs. 3 and 4.—*Acronycta* (*Viminia*) *menyanthidis.* Larvæ partly fed in first skin × 24 diam.

Fig. 5.—*Acronycta* (*Viminia*) *myricæ.* Larva full fed in first skin, indeed close upon first moult × 22 diam.

Fig. 6.—*Acronycta* (*Viminia*) *venosa.* Larva fed a very little in first skin × 34 diam.

Fig. 7.—*Acronycta* (*Viminia*) *rumicis.* Larva half fed in first skin × 27 diam.

Figs. 8 and 9.—*Acronycta* (*Bisulcia*) *ligustri.* Larvæ well fed in first skin × 22 diam.

Fig. 10.—*Acronycta* (*Cuspidia*) *aceris.* Larva in first skin newly hatched × 30 diam.

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page* 172.)

It has been suggested, and I have known it assumed as fact, that exposure to cold frequently darkens the colour of certain double-brooded species of lepidoptera, and have seen *Selenia illustraria* brought forward to illustrate the assumption. But, if cold could aid, in any way, the production of melanic forms, why, in Britain, do we get our most melanic forms on the west coast of Ireland, where, owing to the influence of the Gulf Stream, the temperature is, for the latitude, exceptionally high? It is also a matter of fact, that species from dry open areas in the high latitudes of America and Europe present no traces of melanism.

The first writer on the subject of dark coloration being produced by a low temperature, was Professor Weismann. To me, his experiments, so far as lepidoptera are concerned, appear of little or no value. The incidental influences of moisture, etc., appear to have been overlooked entirely, and his experiments were too general to be of much service. Mr. Merrifield has been paying considerable attention to the influence of temperature on seasonably dimorphic species, and his general conclusions (*Transactions of the Ent. Soc.*, 1889, pp. 78–97) are of much greater value. Professor Weismann principally directed his attention to the application of a low temperature to the pupa, and considered, that retardation in this stage, was the principal factor in producing a dark coloration in a winter form of a double-brooded species, where

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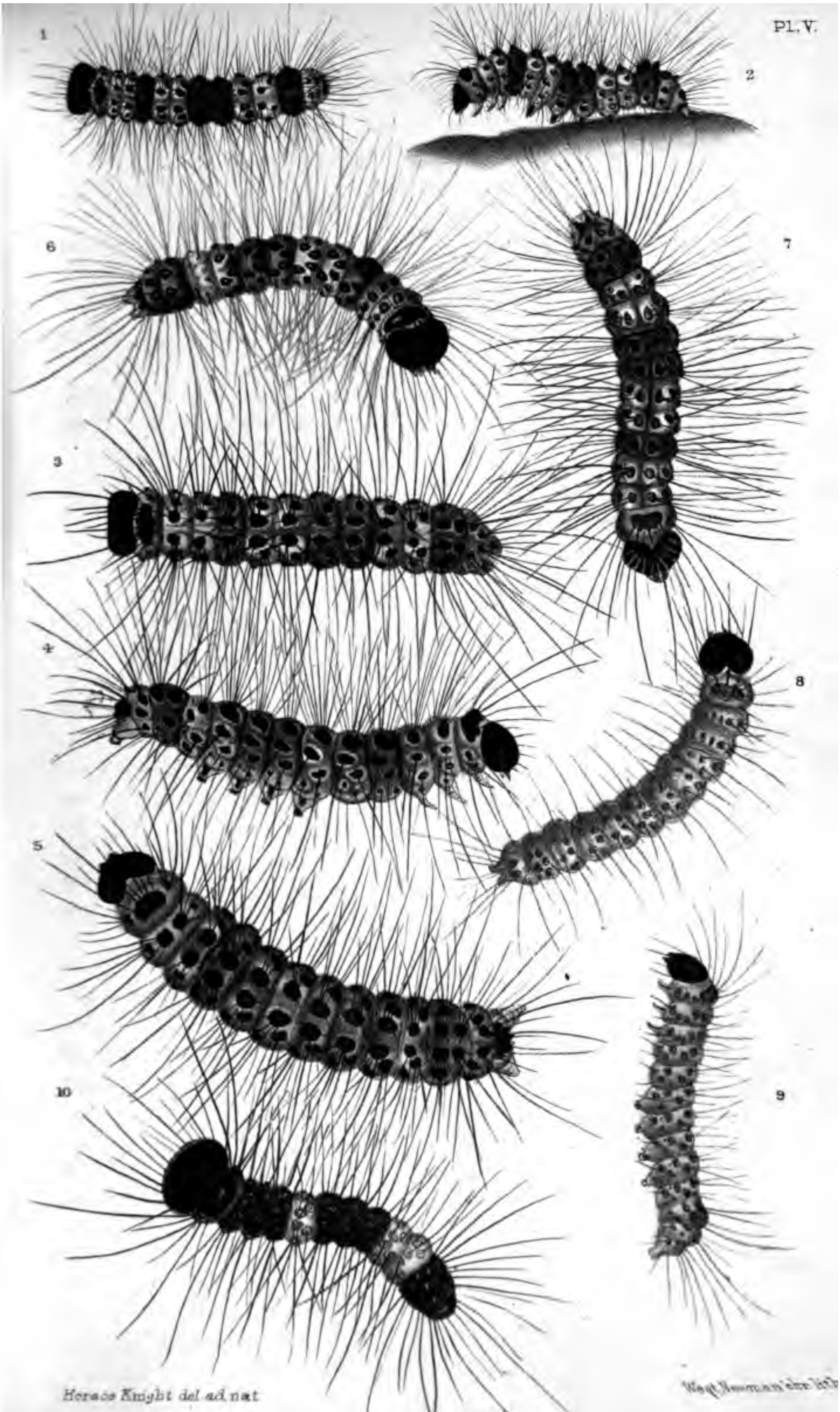

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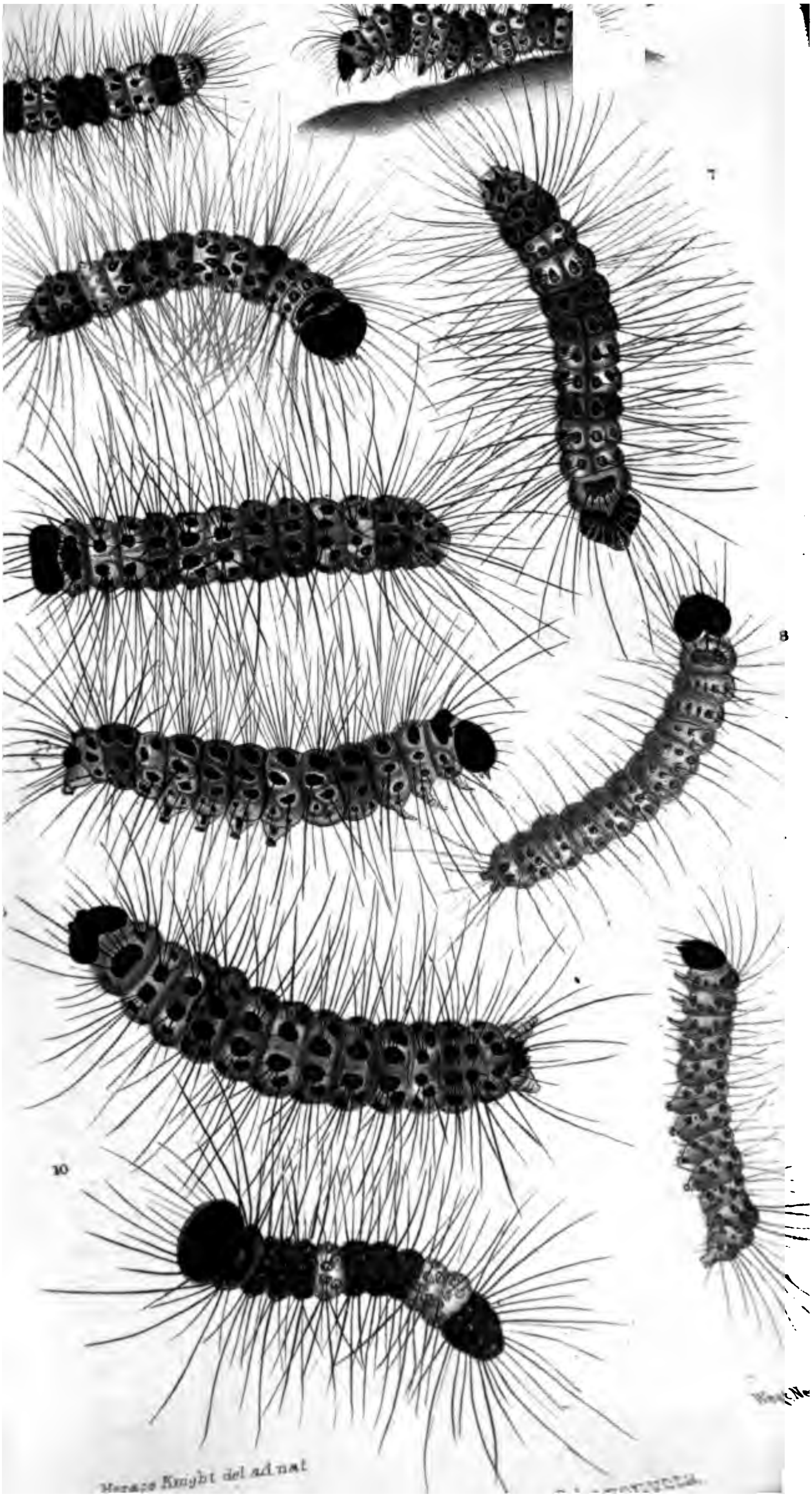

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the seasonal forms were dimorphic in colour; but I believe myself, that the influence (whatever it may be) which produces a dark coloration in these species, acts but very little (if at all) in that stage, and that the larval stage is the one most affected by the exciting influence. If this darkening takes place by retardation in the pupal stage, then, the insects of northern Europe and America, instead of being, as they are, more than usually pallid, would be excessively dark, for many north-country species appear normally to pass two years in this stage. It is in mountainous and other humid districts, that we find dark-coloured insects developed, and, since the spring specimens of several seasonally dimorphic species (*Tephrosia crepuscularia*, *Selenia illustraria*, etc.) are darker coloured than the summer specimens, I think it more than likely, that delay and environment have infinitely more influence in the larval stage, than the same influences can possibly have on the comparatively quiescent pupal form. It is, therefore, advisable to note, with regard to these dimorphic seasonal forms, that Mr. Merrifield writes:—"In the double-brooded species, the governing consideration is, which brood am I to belong to—the summer form or the winter form? and that decision can only be arrived at in the larval (growing) stage, and may be then controlled by external influences, *e.g.*, temperature.[1] I do not believe that temperature[2] can ever convert the one form (summer or winter) into the other, unless brought to bear on the larval stage" (*in litt.*). Again, after all the care that Mr. Merrifield has taken with his "temperature" experiments, he writes:—"Like you, I am by no means prepared to accept the position that cold causes melanism. *I think it quite probable that, in some cases, it may produce an opposite effect*" (*in litt.*).

I will now quote one or two more of Mr. Merrifield's observations, which appear to me of importance, and the value of these remarks is enormously increased, when we consider, that, having his attention directed especially to "cold" as the cause of the darkening, he could not reconcile his results as being borne out by differences of temperature. He writes:—"So far as my experiments on pupæ have gone, the results of them appear in close accordance with those of Professor Weismann, but other experiments seem to indicate that the temperature[3] to which the larva is exposed in its growing stage has much to do with the colouring of the perfect insect" (p. 82). Mr. Merrifield also writes:—"As to the causes of variation in *colour*, markings and shape, the inquiry is a more complicated one, of course embracing the pupal stage, though I am inclined to think, for reasons I will give, that it should by no means be confined to that stage" (p. 84). The first observation relates to *Ennomos autumnaria*, which were bred in the "wet" and cold summer of 1888. There were three sets: one kept out of doors and exposed to wet and cold; a second kept indoors in a "drier" and warmer atmosphere; whilst a third was kept indoors but "bottled." Mr. Merrifield, treating his as "temperature" experiments, supposed the differences in these sets to be due to the difference in temperature. I consider the difference due to the difference of the "wet" and moist conditions to which the larvæ were subjected. Mr. Merrifield writes:—"In *autumnaria*, the difference (between these first two sets) is most marked and very conspicuous. . . . . Generally, if not always, the spots and marks of the forced ones are less dusky, *and not nearly so dark;* nearly all the males, and all but one of the females, have fewer spots than the corresponding sexes in the sleeved; on the underside[1] the differences are more strongly marked. The general result is, that of the 26 forced, there is only one that comes up to the general standard of the 24 sleeved in abundance and in darkness of spotting and other marks, and there are only 3 of the sleeved, which, in lightness of spots and marks, approach the general hue and appearance of the 26 forced" (p. 86). That is, those that were exposed to the wet season of 1888 as larvæ, were much darker than those bred indoors and protected from these conditions. Mr. Merrifield, regarding this experiment, goes on to say:—"The difference in appearance between the forced and the sleeved being so marked, I give in detail the facts, which appear to indicate that, in this case, the conditions to which the larvæ were subjected may have had much to do with the very striking difference in the moths. One of two conclusions, at all events, seems almost to follow from the experiments, viz., that the larval period was the critical one, or that the colour of the perfect insect, in this single-brooded and summer-pupating species, can be affected by exposing the pupæ to a very moderate difference of temperature." Mr.

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[1] If accompanied by humidity.—J.W.T.

[2] Mr. Merrifield's experiments were based on temperature. He therefore assumed that all his results were produced by temperature.—J.W.T.

[3] I consider these differences caused by the more "wet" condition.—J.W.T.

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[1] This tends to prove my previous statement, as to looking for variation on the underside of butterflies. This moth rests like a butterfly with its wings drawn up *over its body.—J.* W.T.

Merrifield then goes into particulars of these two broods, together with the third or "bottled" brood. But, in all these particulars Mr. Merrifield argues as if only temperature were to be noticed, although he states that whilst there was so much difference between the "forced" and "sleeved" imagines, the "bottled," kept indoors at a comparatively high temperature, and which, if temperature were the prevailing factor, ought to be more like the "forced," turned out to be, "in colour and intensity of marking, not far from the sleeved." The process of "bottling" at once tends to place the larvæ under moist and humid conditions, which seem to have affected these in the same way as the rain of 1888 affected the sleeved. Mr. Merrifield then writes :—"If the great difference between the forced and the sleeved originated in the pupal period, it would seem to follow, that the difference between about 66° and about 75°–80°, during an exposure of a very few weeks, is sufficient, in this species for thc purpose" (p. 89). Now, I would ask, how, in the name of common-sense could this be? If this were so, pupæ subjected to this difference of temperature would produce two forms of the same moth, and every *autumnaria* spending its pupal period at 66° should have a tendency to melanism. Other species, I presume, should follow the same rule. Nothing, I think, better shows that Mr. Merrifield was right, when he wrote :—"I think the *larval* period is the critical one," and again :—"I do not think temperature can ever convert one form into the other, unless brought to bear on the larval stage," than the extract just quoted. There is no doubt the action of moisture (it may be more or less affected by temperature at the same time, but I fail to see how) on the larva is the cause of the darkening.

Professor Weismann had recourse to a very far-fetched notion to explain the reason why he supposed, that, although a difference of 14.9° R. (33.5° F.) between the German winter and summer temperatures failed to originate a climatic variety of *Papilio podalirius*, a difference of 9° F. between the summer temperatures of Germany and Sicily was sufficient to do so; his suggestion being, that the cause was to be found in the absolute temperature reached; and I am rather surprised that Mr. Merrifield seems inclined to follow him in (what appears to me) his fallacious reasoning. However, for our purpose, it is sufficient to consider that Professor Weismann and Mr. Merrifield are both obliged to leave the "cold" theory, to explain in other ways, why climatic races are developed in countries with high temperatures. In short, the "cold" theory of melanism can only be maintained or bolstered up by finding different explanations for almost every different case. I have no doubt, that, if Mr. Merrifield's attention had been directed to humidity as a cause of darkening, my own ideas of melanism would have received substantial corroboration. I think no better proof of the small effect "cold" can have in darkening colour, could be produced than Mr. Merrifield's remarks on "icing." He writes of some moths, produced from pupæ iced for a considerable time:—"The cooling in this case not produce any change of colour, or, if any, it is a very slight did one." Again, about another experiment, Mr. Merrifield (p. 93) writes:—"The later ones of the 8 are very much darker than the earlier ones, and, though the progressive darkening is not quite regular, it is difficult to look at them without thinking that retardation of development has been the operative cause, *the retardation in this case not being associated with cold*, as the pupæ have rarely or never been at a lower temperature than 60°. There are some other facts which rather favour the view that retardation, *without cold*, may be a cause of, or at least be associated with, darkening," etc.; and again (p. 94), "there is no marked difference (in colour) between those which have been frosted and the rest." What a pity it seems that Mr. Merrifield's attention had not been directed to the incidental circumstance of "humidity," as some most valuable results would undoubtedly have been obtained.

Lord Walsingham's paper on Melanism, which has attracted some attention, is also based on temperature. His paper can hardly be said to propound a theory, as it scarcely seeks to show what is the cause of melanism, but that, melanism once having been produced, the dark coloration is an advantage to the insect possessing it; it then goes on to suggest that this advantage, therefore, is the cause of the insect being melanic; although, how it can in any way be looked upon as a "cause" of melanism, I fail entirely to see. But we have to bear in mind that, although the whole of Lord Walsingham's theory (?) (*Presidential Address to the Yorkshire Naturalists' Society*, 1885) that melanism is probably due to the rapidity with which the insects would absorb heat because of their darker coloration, is extremely interesting and full of good reasoning, yet it is entirely misleading, because based on entirely fallacious data. The assumption, that insects from high latitudes are *generally* melanic, is entirely erroneous. They appear to be in some instances, if we confine ourselves to the British Isles, or even to the western shores of Europe under the influence of the Gulf Stream, but, in the high latitudes both of Europe, Asia, and America, especially at low altitudes, melanism is practically unknown. Mr. Dobrée (*Entom.* xx. pp. 25–28) thoroughly exposed this fallacy, and showed how incorrect it was, and Mr. Jenner Weir (*Entom.* xx. p. 85) supported Mr. Dobrée's facts; and, since the whole of Lord Walsingham's theory was based on this incorrect assumption, the misleading character of the theory may be easily estimated. The actual fact "that dark colours would be advantageous to insects, owing to the rapidity with which they would absorb heat," is a simple statement of fact that the most elementary student of physics would understand; but that this is the cause of melanism is another matter, especially when it is assumed, that, as the temperature gets lower, the moths get darker, which is contrary to fact, unless the lower temperature is accompanied by increased humidity. Lord Walsingham, too, allows nothing for the fact that moths generally fly by night, and that radiation would have to be taken into account, as it is another elementary fact in physics that "good absorbers are generally good radiators;" but still the previous fact, that the moths of northern latitudes are *not* generally given to melanic tendencies, renders most of the arguments in the paper equally abortive.

Mr. Dale, in the *Young Naturalist* Supplement, Jan. 1890, pp. 37, 38, after pointing out that melanism is essentially characteristic of the most humid districts, asserts that:—"The dry chalk soils of the South absorb a greater amount of heat than the wet peaty soils of the North, and to that, in conjunction with the fact that there is more rain and consequently less sunshine in the North, is melanism entirely due." Grandly assertive, but entirely unconvincing, this was rather severely handled by Lord Walsingham in the February number of the same Magazine, but Mr. Dale again comes to the front, and begins by denying one of the most elementary laws of physics, viz.:—that dark-coloured substances do absorb more rapidly than light-coloured, and then adds:—"The pith of my argument is this—dark-coloured soils absorb a great deal of moisture and cannot absorb so much heat as light-coloured soils, which are dry." Here Mr. Dale assumes, evidently, that all dark soils are necessarily "heavy" (*i.e.*, retentive) soils, and *vice versâ*, an obvious error. The amount of heat absorbed by the soil depends on the quantity of water in it *which does not drain through*—in other words, on the quantity of evaporation to be effected by the sun's rays, before they can commence warming the soil. Side by side and equally well drained, a dark clay absorbs more heat than white chalk. Mr. Dale's statement above—"Consequently less sunshine," etc., is again difficult to understand. More rain does not always mean less sunshine. Probably the most brilliant sunshine in the world is found in India, and yet some parts of India register above 400 inches annual rainfall. In fact, Mr. Dale's notes are scarcely worth serious criticism; they offend against the most elementary facts of geology and the most elementary laws of physics.

I think cold may therefore be looked upon as quite a minor factor in the production of melanic forms, even if it may not be altogether neglected, for it is clear that the coldest areas do not normally produce dark-coloured insects, and if cold areas do not produce melanic forms in nature, I think it a satisfactory deduction that experiments, based on temperature, which appear to give results tending to show that a low temperature does produce dark-coloured forms, should be looked upon with grave suspicion unless all attendant circumstances have been fully taken into account. At present, I am inclined to look beyond temperature for the explanation of results, which appear to have been produced in experiments based on temperature, and there is no doubt that, had the experiments been carried out with a view of testing the influence of moisture, much more satisfactory results would have been obtained.

(*To be continued.*)

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ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Aphytoceros vagans, n. sp. Tutt, *Ent. Rec.*, 203 (introduced).

At the meetings of the City of London Ent. Soc., Oct. 16 and Nov. 6, the following changes in the nomenclature of British Noctuids were suggested by Mr. Tutt. *Tæniocampa* to include *leucographa* and *rubricosa*; *Miana fasciuncula* to be reduced to *strigilis* var.; *Mamestra abjecta* to be placed in the *adusta* group of *Hadena*. It was also stated that *leucostigma*[1] was apparently not an *Apamea*, and that *Luperina* var. *nickerlii* of South was not Freyer's insect of that name.

Opsibotys is proposed as a new generic name for Lederer's first division of *Botys* (type *O. fuscalis*, Schiff.), by W. Warren, *Ann. Mag. N.H.*, Dec., p. 474. *Botys* disappears from among the Pyrales altogether, the original type of that genus being the *Lythria purpuraria* of modern authors.

COLEOPTERA.

Canon Fowler's *Coleoptera of the British Islands* is a work which will of necessity be consulted by all those interested in our beetles, so that any account of its contents or detailed enumeration of the changes from the older works becomes almost superfluous. In vol. iv. we are glad to see the generic name *Longitarsus* adopted, as its validity has long been recognised in other countries. Under *L. jacobææ* is described a new var. *rufescens.* On p. 304 *Chrysomela staphylea* is described with a new var. *sharpi* from the Solway district.

Anthonomus rosinæ Des Gozis, W. W. Fowler, *E.M.M.*, 312–313. Repton, Burton-on-Trent, and Norfolk. A very small species, allied to *A. ulmi.*

HYMENOPTERA.

Fr. W. Konow, Tenthredinidæ Europæ. *Deut. Ent. Zeitschrift*, 1890, Heft ii., pp., 225–255.

This important paper contains a synopsis of the genera and a list of the species of European sawflies. There are also descriptions of many new genera, which it is to be hoped will prove more satisfactory than some sawfly "genera" have done in the past. The changes in the names of our British species are many. *Cimbex silvarum*, F., appears as *C. femorata*, L. *Hylotoma*, Latr., becomes *Arge*, Schrank. *Euura*, Cam., becomes *Cryptocampus*, Htg. On the other hand, *Sirex*, L.. is used instead of *Urocerus*, Geoff., as is usual in this country and contrary to the custom in America. The new genera include the following :—

Amauronematus n. g. with *glenelgensis* Cam., *humeralis* Zett., *arcticus* Thoms., etc.

Pachynematus n. g. for *einersbergensis* Htg., etc.

Lygæonematus n. g. for *ambiguus* Fall., *scoticus* Cam., etc.

Micronematus n. g. for *hibernicus* Cam., and *abbreviatus* Htg.

Eriocampoides n. g. for *testaceipes* Cam., and *cinxia* Klg.

Apanteles ruficoxis, Marshall MS., n. sp. (sine descr.), Bignell. *Entom.* 383. Bred from *Chelonia villica* found at Torcross, S. Devon.

Sapholytus connatus, Hartig, Cameron, *E. M. M.* 313. Reared from galls of *Andricus noauli*; Clydesdale.

Xestophanes brevitarsis, Thoms., Cameron, *l.c.* Galls on *Potentilla tormentilla.*

Aulax hypochæridis, Kieff., Cameron, *E. M. M.* 314. Swellings on peduncles of *Hypochæris radicata.*

—T. D. A. C.

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[1] This species is placed in a separate genus (*Helotropha*) near *Hydræcia* in Dr. Staudinger's list.—ED.

SCIENTIFIC NOTES.

FECUNDATION BEFORE HYBERNATION.—There seems to be a great deal of doubt as to whether those species of Lepidoptera that hybernate, pair in the autumn, or whether the sexes take no notice of each other until the following spring. I have heard it remarked of some *Vanessæ*, that only the females hybernate, but I have myself found males of most of them in the spring I have captured *Vanessa polychloros in copulâ* in August on two or three occasions. Have any of our readers facts on this subject?—J. W. TUTT. *December*, 1890.

PUPÆ IN A COMMON COCOON.—About the middle of last month I opened nine or ten cocoons of *Bombyx trifolii*, which I considered overdue; in one of these, in no way larger than the rest, I found two pupæ pressed together. They appear to be females, and much smaller than usual. This agrees with what Mr. G. M. A. Hewett speaks of in the case of the closely allied *Eriogaster lanestris.*—F. B. NEWNHAM, Church Stretton, Salop. *October*, 1890.

DISEASE AS A CAUSE OF VARIATION.—I have a strong opinion that disease is, in some cases, the cause of many aberrations, especially where the two sides of the insect do not coincide. To any one who has bred lepidoptera in quantities (especially Macros), the occurrence of holes (in the hind wings more generally) is a common thing. That it is caused by injury before the insect emerges from the pupa is evident, for were this not the case, the fluid (which, I believe, causes the expansion of the wings) would exude through the edges of the hole, as can readily be proved. I believe this to be the liquid, which is afterwards exuded from the anus of the insect as a drop of whitish, reddish, or chocolate-coloured fluid, and to be simply the excess of moisture which is thus disposed of.—C. FENN, Lee. *November*, 1890.

I should like to refer to the hole or malformation in the hind wing of Mr. Robinson's aberrant, *Orthosia upsilon.* Mr. Fenn is certainly correct in saying that such holes are caused by injury before entering upon the pupal stage. No doubt our artificial mode of breeding increases the danger of such malformations, and of cripples generally, but that such do occur at large now and then, a specimen of *O. macilenta* which I took at ivy this season, will show. This example has two holes, one large, the other small, both round and separated by wing nervures. The microscope shows the edges of the holes to be quite smooth, and there is little or no disturbance of the scales. The malformation (with a concave piece of the hind wings absent) which takes place in the hind wings of *Liparis dispar*, appears to be of very frequent occurrence, and I once bred a specimen of the large American Bombyx,—*A. polyphemus*—with the wings deeply indented in the same way.—G. C. GRIFFITHS, Clifton, Bristol. *November*, 1890.

There seems very little doubt in my mind, that most malformations become absolutely fixed at the moment that the larva becomes changed to a pupa. Any one, who has had the good fortune to observe an insect at this point, would immediately be struck with the fact that, at the final larval exuviation, the external organs of the imago in their *rudimentary form* are perfectly formed and shaped, and that the larva at that moment has every character of the imago. The epidermal secretion which immediately takes place, and which, hardened, becomes the chitinous covering which we call the pupa case, is an external structure, and perfectly separate and distinct from the immature imago which it envelops, although the separation only becomes absolute as scale development proceeds and is matured. It must be perfectly clear, therefore, that the slightest injury at the moment of change, will cause the secretion which forms the chitinous case, to be imperfect, the membrane will probably be injured, the scale development at such point of injury fails to become normal, and malformation is the natural result. Holes in wings are, however, occasionally due, to minute parasites, which, although sapping the vitality of the host, do not cause death, and the parasite escaping from the pupa case, before the imago, leaves a tiny hole through all those portions of the wing (membrane, etc.), through which it had to make its exit. Total absence of wing development, which we frequently find, appears to be due to the first cause (injury at pupal change).

But disease not only produces monstrosities and aberration of form, it also produces variation in markings. Cripples are well known, owing to imperfect cell-development, to tend to have a coalescing of spots and markings, and dots are frequently formed into more or less imperfect bands in crippled specimens. I bred a long series of *Arctia menthastri* from pupæ sent me from Scotland. They were all strongly marked, one being an exceptionally fine radiated form (var. *walkeri*). However, many never emerged, and, on opening the dead pupæ, I found nearly all were of the dark radiated variety. It would appear that those pupæ which were too weak to emerge had a greater tendency to vary than those that emerged. I may add that many of this brood had more or less malformed wings. Here, I feel satisfied, disease was the general cause of the variation. It would be interesting to have other facts.—J. W. TUTT. *December*, 1890.

The malformation on the margins of the wings, mentioned by Mr. Griffiths as occurring in *L. dispar*, is probably due to interbreeding. It has been more particularly noted in *L. dispar* and *Macaria notata* than in any other species.—SYDNEY WEBB, Dover. *November*, 1890.

SUDDEN DEVELOPMENT OF THE WINGS OF CHESIAS SPARTIATA.—I have been breeding *C. spartiata* and have noticed four nights in succession, that a specimen has been out, running rapidly over the muslin top of the box, but with tiny unformed wings. On looking into the box in the morning, the appearance was just the same until about 8 or 9 a.m., when a pair of long pointed wings would suddenly drop. Is this usual? and why do the wings remain so long undeveloped and then develop suddenly?—E. BAZETT, Reading. *November*, 1890. [This is so opposed to our ordinary ideas of wing-development, that it would be interesting to get further information as the result of observation.—ED.]

GLANDS ON THE THORAX OF CERTAIN LEPIDOPTERA.—Has any one noticed that *Liparis salicis* has the power, when annoyed, of ejecting a pale greenish or yellowish fluid from (apparently) glands, situated on the thorax, above the eyes? I have specially noticed this lately.—C. FENN. *July*, 1890.

In July last, Mr. Fenn mentioned that *L. salicis* has the power of ejecting a fluid from (apparently) glands, situated on the thorax, and I find that that species is not the only one similarly provided. At the time I read Mr. Fenn's note, I was breeding *Arctia caia*, and found that if the thorax of that species is gently pressed, or the insect irritated, two glands situated just in front of the red collar of the thorax, give out drops of greenish fluid. These glands appear, under the microscope (after denuding the thorax of scales), as whitish processes, larger at the orifice than below, and the fluid when tested with litmus paper, gives a slightly acid reaction. The species is certainly a distasteful one to birds, as also is *salicis* according to Mr. Poulton's experiments, and it seems as if this fluid may be one of its means of defence, as it would probably be sufficiently acrid to disgust any bird which might approach it. On mentioning the matter to my friend Mr. Prideaux, I found that he also had this summer, noticed for the first time these glands in *A. caia*. I hope, as opportunity offers, to examine other species with a view of ascertaining whether they possess these organs.—G. C. Griffiths, Clifton, Bristol. *November*, 1890.

These glands are present in many Cuspidates I believe. Is the acid not a form of formic acid?—Sydney Webb, Dover. *Nov.*, 1890.

[I have repeatedly noted these glands, and, like many other subjects, thought it was hardly worth recording until brought to my notice by someone else. It is to be hoped that further attention may now be given to the subject.—Ed.]

CURRENT NOTES.

The *Young Naturalist*, which has now become quite a recognised entomological Magazine, is to commence the new year under the title of the *British Naturalist.*

Mr. E. A. Butler, F.E.S., records the capture of a ♂ and a ♀ specimen of *Nabis boops*, near Gomshall, Surrey, in August last.

Mr. Nelson M. Richardson, F.E.S., records (*E.M.M.*) the larvæ of a *Nepticula* in osier (*Salix alba*); which differ from the larvæ of *N. salicis*, feeding in sallows, although the wings appear the same.

Mr. G. T. Baker, F.L.S., records (*E.M.M.*) rearing *Eulepia cribrum* on ordinary grasses. Mr. Goss, F.L.S., says the same species feeds well on *Erica cinerea* and *E. tetralix*, but starved on *Calluna vulgaris.*

Mr. W. W. Smith (*E.M.M.*) notes great flights of *Culex*, *Tipula* and *Tetramorium* in New Zealand.

Professor C. H. Fernald, Mass., U.S.A., says that:—"Mr. Meyrick's revision of the *Pyralidina* of Europe (*Trans. Ent. Soc. of London.*, Part III., 1890) is one of the most important papers on Systematic Entomology that has appeared for a long time."

A specimen of *Chærocampa nerii* is reported to have been captured by a lad of twelve, flying round honeysuckle near Dartmouth.

VARIATION.

Small var. of Euchlöe Cardamines.—I possess a ♂ which is the same size as the example recorded by Mr. Hall (*ante*, p. 98). It was captured in Epping Forest on May 22nd, 1889. Innutritious or insufficient food is probably the cause of these dwarfs.—J. A. Simes. *December*, 1890.

American Varieties of British Lepidoptera.—For the following Geometræ, see Packard's *Mon. Geom. Moths* (1876), and other works:—

Hypsipetes sordidata v. *nubilofasciata*, Pack. Primaries yellowish white, with nine transverse bands; the broad pale band well defined.
v. *albifasciata*, Pack. Ground colour of primaries dark olive-green, with blackish irroration; medium transverse band white and well developed. A Californian form.
Cidaria truncata v. *brunneata*, Pack. A small and dusky form from Labrador.
Cidaria prunata v. *nubilata*, Pack. Markings well developed; much like Newman's figure.
v. *destinata*, Moeschl. Markings more broken up, after the manner of Newman's figure of *miata*.
v. *lugubrata*, Moeschl. A form allied to the last but more suffused.
Coremia munitata v. *labradorensis*, Pack. A dark form from Labrador.
Melanippe fluctuata v. *ideata*, Guen. Very near the type. Secondaries white, with the markings less distinct.
Triphosa dubitata v. *hæsitata*, Guen. California. Larger, wings more pointed.
Metrocampa margaritata v. *perlata*, Guen. The extradiscal line bent at right angles on the costa.
v. *perlata*, subv. *viridoperlata*, Pack. California. Rather larger than the eastern form.

The above list merely comprises a few notes thrown together, and is far from complete.—T. D. A. Cockerell. *October*, 1890.

Local Variation.—The ground-colour of the Aberdeen specimens of *Hepialus hectus* tends more to orange, and they are somewhat larger than those I take in Epping Forest. *Melanthia ocellata* from the same district, differs from those I meet with about London, in that the smoky marks in the white spaces are much more strongly developed.—F. J. Buckell. *October*, 1890.

Distribution of Cidaria suffumata var. piceata.—*C. suffumata* is one of the most interesting species we take in our district, on account of the great proportion of dark varieties occurring. On May 13th, Mr. Scarre and myself netted 23 specimens, of which 1 only was typical, all the others being intermediate or dark forms. The species soon gets damaged, sitting as it does with wings expanded, exposed to wind and rain.—W. Newman, Darlington. *May*, 1890

At Chingford in Essex, I have only taken the type of *C. suffumata*, the variety does not seem to occur.—A. MERA. *May*, 1890.

I have taken *C. suffumata* here in more than one locality, but never saw any like Mr. Newman's dark form from Darlington. Those I take here appear to be a little lighter than even his type specimens.—T. J. HENDERSON, Glasgow. *June*, 1890.

I have never captured anything here approaching the dark form of *C. suffumata*. Those that occur are quite of the type form.—(Rev.) W. F. JOHNSON, Armagh. *June*, 1890.

I took here last season a single specimen of the dark var. of *C. suffumata*, and my cousin took another. These are all the captures I know of in this locality.—E. D. BOSTOCK, Stone. *June*, 1890.

There are three distinct forms occurring in this part of the country. I have taken more dark forms this year than I ever remember seeing before.—ARTHUR HORNE, Aberdeen. *May 30th*, 1890.

I have never met with the dark form of *C. suffumata* in Devonshire, but ordinary coloured forms are common.—J. N. STILL. *June 4th*, 1890.

The darkest forms of *C. suffumata* occur sparingly here, but I think our typical form is clearer and brighter than the Aberdeen specimens.—J. MASON, Clevedon Court Lodge, Somerset. *June 11th*, 1890.

The dark Aberdeen specimens of *C. suffumata* are darker than any I get here.—G. BALDING, Wisbech. *June 24th*, 1890.

I have taken *C. suffumata* at various times, comprising the dark as well as the typical forms.—S. WALKER, York. *July 5th*, 1890.

BLACK VAR. OF ZYGÆNA FILIPENDULÆ.—In the *Record*, *ante*, p. 152, you mention the capture of a black var. of *Z. filipendulæ* by Mr. Goss. I have a very similar specimen. The ground colour of the upper wings is of the usual shiny greenish black, as is also the border of the under wings, the spots and ground colour of the under wings are, however, of a dull black colour, the spots thus showing up very distinctly. I reared it from pupæ gathered at Fleetwood in the spring of 1888. One morning, in the July of the same year, I found two of these black varieties had emerged, with about twenty others of the ordinary form. One I kept, the other I gave to Mr. South.—T. BAXTER, St. Anne's on the Sea, Lancashire. *October*, 1890.

EPINEPHELE HYPERANTHUS VAR.—I captured in the New Forest, on July 22nd last, a fine var. of *Epinephele hyperanthus*. The under side is very richly ornamented with large ovate ocelli with white central *streaks* instead of the usual white dots, and each ocellus is beautifully outlined with clear yellow buff. The markings on the upper side are well defined, but smaller than those on the under surface. The specimen is a fine ♀ in perfect condition. Apparently, the dull damp summer we have had this year, has had a tendency to produce large and well marked forms of this species, as many specimens I have seen are far above the average in both size and markings.—F. W. FROHAWK. 1890.

VARIATION OF ŒNECTRA PILLERIANA.—There is a question which I have had on my mind for some time.—It relates to one of our Southern TORTRICES—*Œnectra pilleriana*, viz.—Are the forms which occur in the New Forest, Dorsetshire, etc., identical with the Isle of Wight *species?* They appear to me to be very distinct; and is there not some question unsettled about the foodplants of their respective larvæ?—C. FENN, Lee. *November*, 1890.

The Isle of Wight and Dorsetshire *Œ. pilleriana* have also appeared to me very dissimilar, but as I only possess two or three of the latter specimens, I cannot speak with any degree of certainty. How this species came to be regarded as British in the first place, has always puzzled me. Continental *pilleriana* were said to feed on vine. Mr. Wilson Saunders' unique Isle of Wight example, was bred from *Iris fœtidissima*, a most singular foodplant, for any other than a root feeder to adopt, but his known accuracy of observation prevented any doubt from being thrown upon it. I have seen this insect, and, like the chameleon, it had changed its appearance. The specimen in his cabinet was an undoubted *Tortrix rosana*, very strongly marked. Possibly there were but few Micro collectors present when this specimen was exhibited, and it thus passed without question. The locality was very near the little church (St. Lawrence, I think) between Ventnor and Black-Gang. His after examples, true *pilleriana* were obtained in subsequent years by sweeping.—SYDNEY WEBB, Dover. *November*, 1890.

In the account of the meeting (September 25th) of the South London Entomological and Natural History Society, on page 191 of the *Record*, Mr. P. M. Bright is said to have exhibited "a series of the heath form of *Œnectra pilleriana* (Bournemouth), which is strikingly different from those obtained by Mr. Eustace Bankes and other collectors in Dorsetshire."[1] As this locality has been given under a misapprehension, I should like to state at once that none of the specimens of *Œ. pilleriana* which I have ever sent out, have come from Dorsetshire, but they have all been bred from larvæ found in the Isle of Wight. Mr. Bright's specimens are *precisely identical with* the small brownish-ochreous variety (♀ darker, unicolorous), which occurs locally in some of the bogs on our extensive *heaths*, and is the *only* form known to occur in this county. The larva of this small brownish form feeds on *Narthecium ossifragum* (bog asphodel).—All the specimens received from me have been of a large handsome reddish-ochreous variety (♀ unicolorous, very glossy rich dark chesnut) of the insect, which I have never seen from elsewhere; and, in my series are specimens from Devonshire and from Ventnor, which are intermediate between the two extreme forms already referred to. In addition to bog asphodel, the larva has, to my knowledge, been found in Britain on marjoram, knapweed, sea lavender, and seeds of stinking iris, while the number of its foodplants on the Continent is legion. A most interesting chapter might be written about this species with regard to its variation in colour, size, and markings, according to the different spots in which it occurs, and the different foodplants it affects; the peculiarities of the female, and the difference in the dates of its appearance, according to the characters of the strangely dissimilar haunts in which it is found.—EUSTACE R. BANKES, The Rectory, Corfe Castle, Dorset. *October*, 1890.

BLACK VARIETY OF APLECTA NEBULOSA.—I bred a black variety of *A. nebulosa*, from a solitary larva, picked up in the Delamere district, in the spring. Mr. C. G. Barrett says that this form is quite new to him.—J. COLLINS, Lilford Street, Warrington.

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[1] I was under the impression at the time that they were from Dorsetshire.—ED.

VARIETY OF LEUCANIA LITHARGYRIA.—I have bred a very strange specimen of *L. lithargyria*, the variation being connected with the hind wings. These are silvery grey in colour, bordered on the outer margins, by a broad, dark band. The specimen has an altogether "underwing" look about it. The larva was obtained in the Delamere district.—ID. *December*, 1890.

VARIATION OF BOMBYX CASTRENSIS.—This year, I reared 73 perfect *B. castrensis*, 59 males and 14 females. Of the males, 52 are typical, 3 are pale ochreous with the transverse lines only faintly visible, 3 are brownish, and 1 is an unicolorous deep reddish-brown specimen, with the usual transverse lines nearly obsolete. Of the females, 1 is ochreous, the rest are typical. Only about one-fifteenth of the males, therefore, are brownish or reddish-brown in colour.—F. G. WHITTLE, Lothbury, E.C.

CHRYSOPHANUS PHLÆAS var. SCHMIDTII.—I possess two specimens of *C. phlœas* var. *schmidtii*, one, a perfect beauty, evidently just emerged when captured, is "silvery white;" the second specimen (not in fine condition, however) is very similar in colour. They were both captured at Strensall Common, where a large military camp now is.—S. WALKER, York. *September* 12*th*, 1890.

VIMINIA RUMICIS var. SALICIS.—Last June, I captured at sugar, six exceptionally fine dark varieties of *Acronycta* (*Viminia*) *rumicis*, one specimen with the white markings very clearly defined.—J. COLLINS, Warrington. *November*, 1890.

VARS. OF ANTHOCHARIS CARDAMINES.—On the 17th May, 1886, I got a ♀ of *A. cardamines*, in which, what appears to the naked eye to be green markings on the underside of the hind wings, as well as those on the underside of the tip of the fore wings, were replaced, in each case, by cinereous grey markings. This I have called *ab. cinerea.* I caught it while at rest on a fern. On the 16th June, 1887, I caught, in a field close to the station here, a ♀ *A. cardamines* with orange tips which occupy considerably less space on the upper side than in the ♂, and appear rubbed in places; on the underside, however, they are of the normal size. I regret to say that the specimen is far from being in good condition. On the 23rd May, 1888, I caught a beautifully fresh hermaphrodite specimen of *A. cardamines*, in which the right wing is that of the ♀, while the left wing exhibits the coloration of the ♂; the antenna, too, on the right side is considerably shorter than that on the left side. As to the size of this species, I may mention that my smallest specimen, a ♂, measures one and a quarter inches from tip to tip, my largest, a ♀, caught by myself last year, slightly exceeds two inches; this is the largest I have ever seen.—F. B. NEWNHAM, Church Stretton, Salop. *October*, 1890.

IS MIANA FASCIUNCULA A VAR. OF M. STRIGILIS?—A very short time ago I should have had no doubt about answering this query in the negative, but Irish specimens sent me from the Rev. W. F. Johnson (Armagh) have tended to make me give an almost positive affirmative answer. I presume it is well known that *M. fasciuncula* has, in France, always been considered a var. of *strigilis*, but Mr. South, by an oversight, unfortunately put "the cart before the horse" in his *Synonymic*

List, and wrote *strigilis*, Gn., as a var. of *fasciuncula*. In *fasciuncula* I have always considered that we had two well-marked forms: (1). A greyish form = var. *cana*. (2). A bright red form = *fasciuncula*. *Strigilis* is polymorphic, and its varieties not easily classified, there being almost a dozen named vars. But for our purpose, we may consider two forms: (1). The black-and-white marbled form = *strigilis*. (2). The black form = *æthiops*. Now in the South, the black form, although often as large as the mottled form, is generally decidedly smaller, and but little, if any, larger than the *fasciuncula*; in fact, I have many *strigilis* in my series as small as the smallest *fasciuncula*, and I doubt, therefore, whether size will help us with our determination. Now with regard to time of appearance. Those specimens of both, of which I have exact dates, occur between the beginning of June and the third week of July (1888), and the dates and localities of both species appear to be identical; *i.e.*, all the localities which I have found to produce *strigilis* have produced *fasciuncula* at the same time, and my earliest and latest dates have produced both species. Therefore, so far as dates are concerned in the time of appearance, there is no reason, at least in Kent, why they should be considered distinct. Now as to markings. I would suggest that there is not a single point of difference in them. The basal lines are identical, the stigmata, although varying slightly *inter se*, are also identical. The lunular mark, which is the lower part of the elbowed line, and situated on the inner margin within the anal angle, is again identical. In both, specimens occur with the elbowed line complete, and they are exact in shape, direction and position. The shape from the apex to the inner margin is the same in both, and lastly, the claviform undergoes the same modifications, from total absence to a strong ⊢⊣-like mark, joining the basal and elbowed lines under the reniform and orbicular. In markings, therefore, I fail to see a single point by means of which they may be separated. We now come to colour. This has been, undoubtedly, our basis for scientific distinction, but it has absolutely broken down before specimens sent me by Mr. Johnson. He has sent me *fasciuncula*, from the very brightest red, through reddish grey, dull grey, blackish grey, to dark *strigilis*, and I am unable to refer the blackish grey and black specimens any more to *strigilis* than to *fasciuncula*. Of course, in closely allied species, I always look for parallel ranges of variation, and am never surprised when I find them. Here, I am left with the conviction, that either *strigilis* = *fasciuncula*, or otherwise—I am not yet sufficiently trained to discriminate the specimens sent. I need hardly add that I have ample material to work on. At the same time, I have left out of account the life-histories, of which I must acknowledge absolute ignorance.—J. W. TUTT. *December*, 1890.

Mr. Tutt's statement, that "*M. fasciuncula* was a var. of *strigilis* without doubt" (*Record*, p. 218), has surprised me very much, and I have no hesitation whatever in replying that *M. fasciuncula* and *M. strigilis* are "without doubt" perfectly distinct. Both occur here in abundance, and some of my earliest recollections in connection with sugaring refer to these two moths. *Fasciuncula* used to visit my sugared trees in the garden and a lane near in profusion, but was always much earlier in appearance than *strigilis*, appearing in May and June. *Strigilis* began to appear at the end of June, but not until *fasciuncula* was getting over, and was in full force in July.[1] *Strigilis*, too, is distinctly the bigger insect, and has the forewings proportionately longer; consequently, *fasciuncula* always has a more "stumpy" appearance when at rest on the sugar. Then again, the colour is totally different in this district; *fasciuncula* has two very distinct forms, one red, the other brownish-clay colour, but it varies very little between or beyond these two forms. *Strigilis* here is nearly always black or nearly so, the marbled forms occurring very sparingly. But we have no form in any way intermediate between the forms of *fasciuncula* and the forms of *strigilis*, and out of the profusion of specimens I have seen, I never saw one of either species which could be mistaken for the other. The markings of the two species are also different. I don't know what Mr. Tutt considers the type form of *fasciuncula*, and I am quite at a loss to conceive what the form is like which he describes as being "perfectly intermediate and equally well named as either species"!—Geo. T. Porritt, Huddersfield. *November* 19*th*, 1890.

NOTES ON COLLECTING, Etc.

Notes of the Season (Lepidoptera).—*Deal.*—It will be seen, on comparing Mr. Fenn's note (*ante*, p. 203) with this, that the best sport we had was among the TORTRICES. Among the TINEINA not a great deal was done, although our captures included a few good species. To me, the best were *Tinea simplicella* and *Parasia neuropterella*, which occurred very sparingly indeed on the chalk downs. *Swammerdamia oxyacanthella* swarmed in some of the hawthorn hedges around Deal, and a few specimens of *Hyponomeuta cagnagellus* were met with among the mixed herbage by the sides of the ditches behind the sandhills. What the larvæ fed on there is a mystery to me. A few *Orthotelia sparganella* occurred among *Sparganium*, whilst among the *Depressariæ*, *costosa*, *arenella*, *subpropinquella*, *yeatiana*, *applana*, *pulcherrimella*, *ultimella*, *nervosa*, *badiella*, and *pastinacella* put in an occasional appearance at sugar on the sandhills; the larvæ of *D. heracliana* swarmed in the heads of *Heracleum sphondylium*, and *D. liturella* (*flavella*) was in abundance at dusk at the flowers of *Centaurea scabiosa*. The sandhill GELECHIIDÆ treated us badly. *Lita blandulella* (three or four specimens only), *L. marmorea* and *L. semidecandrella*, all being comparatively scarce; *Bryotropha desertella* and *B. terrella* were more abundant; *Gelechia distinctella* was both worn and scarce, and a few specimens of a second brood of *G. diffinis* were captured just as I was leaving. A single specimen of the second brood of the beautiful *Argyritis pictella* occurred, and a few examples of two or three species of *Anacampis*, which genus puzzles me exceedingly at present. That there are some undescribed species in this group is certain. The tiny form of *Tachyptilia populella* (var. *minor*) from dwarf sallow was abundant; whilst a few *Brachycrossata cinerella* and one *Ceratophora rufescens* completes a very poor record of this large group. *Sophronia parenthesella* turned up at sugar, but I saw none of the genera *Œcophora* and *Butalis*. Two or three of the very commonest species of *Argyresthia* occurred, whilst *Coleophora lixella*, *C. discordella*, and *C. laripennella* were somewhat common on the chalk, and *C. tripoliella* were found occasionally among *Eupatorium*. Larvæ of *Laverna epilobiella* were locally common in the flower heads of *Epilobium*, and a few *L. miscella* flew at dusk, or were disturbed earlier in the day on the Downs. The second brood of *Elachista triatomea* on the sandhills, was almost the only representative of the genus, and beyond one or two of the very commonest *Lithocolletis*, I believe I saw no representatives of the remaining genera.

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[1] *Strigilis*, I know, occurs in the South earlier in June than it does here, but I suppose *fasciuncula* is also correspondingly earlier.—G. T. P.

Among the PTEROPHORINA *Platyptilia bertrami* occurred rarely amongst yarrow, whilst a few specimens of *Amblyptilia acanthodactyla* and *Oxyptilus parvidactyla* flew by day amongst the wild thyme. *Mimæseoptilus phæodactylus* was locally abundant on the Downs among *Ononis;* the second brood of *M. bipunctidactyla* and its vars. was not uncommon; and late *M. fuscus* (*pterodactyla*) were frequently met with. *Œdematophorus lithodactyla* flew at dusk among *Inula*, and *Leioptilus lienigianus*, worn almost beyond recognition, occasionally among *Artemisia*. *L. microdactyla* (much less abundant than the first brood) occurred among *Eupatorium*, both in the marshes and on the Downs, while *L. baliodactyla* and *L. tetradactyla* were rare. *Pterophorus monodactyla* was just appearing, but I did not see a specimen either of *Leioptilus pentadactyla* or *Alucita hexadactyla* (*polydactyla*).

Almost all the species were late, and second broods of many species, generally well on by the end of the first week in August, had only just begun to appear by the 20th of the month.—J. W. TUTT, Westcombe Hill, S.E.

Chichester.—I do not remember a much worse season than the past for lepidoptera. Omitting very common species, the following is the sorry record of those observed and captured. One or two beautiful days in the last week in June, brought out *Sesia tipuliformis* on currant trees in our garden. During July, I took these Geometers:—*Timandra amataria*, *Iodis vernaria*, *Acidalia imitaria*, *Phibalapteryx tersata* and *Anticlea rubidata*. A female of the last named, gave me four dozen eggs, the larvæ of which I reared on *Galium mollugo*, and which duly pupated. On the 25th of the month, I had the good luck to beat out of a hedge a lovely—apparently freshly emerged—*Anticlea sinuata* (*cucullata*). As no *Galium verum* is to be found within miles of the place where I captured this specimen, I should say that the larvæ feed on other species of *Galium*--*mollugo* probably. *Cidaria procellata*, *Eubolia mensuraria* and *Nola cucullatella*, were more or less common according to atmospheric conditions. In August, larvæ of *Smerinthus ocellatus* made their appearance on apple trees in the garden. Sugaring was almost a failure, the best species, which in this month visited the trees, being *Mania maura*, *Catocala nupta*, *Noctua plecta*, *Cosmia diffinis* and *Noctua rubi*. *Apamea oculea* was more than ordinarily abundant, and many were the varieties thereof. At gas lamps in September, *Ennomos tiliaria* (*alniaria*), *Calocampa vetusta*, and *Luperina testacea* were amongst the visitors. Of the last, a dark variety with very white hind wings was taken. On September 24th, a fine male *Acherontia atropos*, which squeaked a good deal, was captured at Selsey, a village about seven miles distant. This is the only specimen of this insect in either of its stages, of which I have heard, in the neighbourhood this year.—JOSEPH ANDERSON, JUN., Chichester.

Hastings District.—I have found lepidoptera scarcer this season than any during the last six years. Early in June, I went to a small wood near this town, where *Epione advenaria* occurs, but only succeeded in taking three specimens. My other captures were *Coremia propugnata*, *Panagra petraria* (both common), one ♀ *Arctia mendica*, *Heliodes arbuti*, *Platypteryx lacertula*, etc. At Guestling, I have beaten the following:—*Ephyra porata*, *E. pendularia*, *Eupisteria heparata*, *Acidalia emarginata*, *Emmelesia affinitata*, *Eupithecia plumbeolata* (common), *Melanthia ocellata*, *Cidaria corylata*, *C. russata*, *Platypteryx falcula*, *Ennychia octomaculalis*, *Botys lancealis*, *B. fuscalis* (common), *Peronea schalleriana*, *Roxana arcuana* (common), *Ephippiphora bimaculana*, etc. *Argynnis selene* and *A. euphrosyne* were both very common. At Camber, on the sandhills, I found *Eubolia lineolata* commonly, also a few *Cledeobia angustalis*. On June 9th, I went to Bexhill, and took a series of *Fidonia piniaria*, ♂, but did not see a single ♀, although the ♂'s were common, *F. atomaria* was also common. At Fairlight, I found *Thecla rubi* and *Satyrus ægeria*, both common, also a few *Lycæna argiolus*. I have not seen a single specimen of *Colias edusa* here this season, although the species was abundant in 1888. I also saw a few last year. I found *Bryophila perla* common on walls, together with a few *Acidalia promutata*; I took a nice var. *flavescens* of the former. Many species, which are usually common here, I have not seen at all this season.—A. FORD, Alexandra Villa, Braybrooke Road, Hastings. *October*, 1890.

Reading.—The autumn, like the summer, has been poor for insects here Sugaring paid for about one week only, from the 24th to the 30th of September. In these few days, I got about two dozen *Xanthia aurago*, and one or two each of *Xanthia gilvago*, *Aporophyla lutulenta*, and *Xylina ornithopus*. Since this time I have got nothing. Ivy is as bad, only the commonest things at it, and few of those. I suppose we cannot expect much, seeing how few larvæ there were in the earlier part of the summer. I never remember the oaks looking so leafy before. Beating for larvæ in September was not much better; I certainly knocked out most of the species I usually find, but very few of each. Only *Demas coryli* fell in plenty from beech. A few *Eupithecia coronata* came out during September from flowers of *Clematis vitalba*, which I had gathered. The most remarkable thing this autumn is the great abundance of *Bombyx rubi* larvæ. The heath, here, is perfectly alive with them. I picked up 140 the other evening, and, next day, when I walked over the same ground, they seemed as plentiful as ever. It is cheering to see *something* in plenty. In the early part of September, I came on a colony of *Nonagria geminipuncta* in stems of *Phragmites communis*, most of them were out and gone, but still I got enough to make a good series.—W. HOLLAND, Reading. *October*, 1890.

London District.—Like many other amateurs, I have found sugar disappointing. *Mania typica* and *Triphæna pronuba* (in their season) literally swarmed. As to the latter, as far as my observations go, I consider this "the *pronuba* year." One night there were seventy moths on sugar, in my garden, and, of these, sixty were of the species named. I managed to secure a long, fine, and varied series. During the last four weeks, moths were not to be caught with sugar, no matter what the flavour, the takings gradually dwindling down to nothing. When the spell of fine, dry weather breaks up, perhaps we may take a few autumn things.—Charles Oldham, Chelmsford Road, Woodford.

Grange-over-Sands.—Sugar has been a failure with the exception of about three weeks, viz.:—the first week in August, the last in September and the first in October, but during the time mentioned many species literally swarmed. On several occasions I counted forty or fifty insects on one tree, unfortunately, mostly common ones. During the last week in September *Epunda nigra* was fairly common, more so than usual. During July I found the flowers of the Scotch lilac extremely attractive to some fairly good species; *Plusia iota*, *P. pulchrina*, *Cucullia umbratica*, etc. being amongst the commoner fry. Some species of larvæ have been very plentiful, amongst those which I noticed more common than usual, were—*Dicranura furcula*, *Sphinx populi*, *S. ocellatus* and *D. vinula*, the two latter being in abundance. During September, I noticed *Eupitheciæ* larvæ common on ragwort. Since May, there have been, practically, no Rhopalocera except *Erebia medea*, which was abundant, flying among bramble. I have recently been working ivy bloom but with little success, not having taken more than a dozen insects per night. I am inclined to attribute my want of success to the stormy weather we have experienced.—G. A. Booth, Grange-over-Sands. *Oct. 18th*, 1890.

St. Anne's-on-Sea.—Never, since I have worked this district, have we had a summer with so much wind and rain, especially the former. Sugar has been an entire failure, I don't think I have taken a dozen moths on it the whole season, although I have tried it repeatedly. One night in August, a beautiful night entomologically, dark, warm, and hardly any wind, I sugared about 200 places the result being one *Triphæna pronuba* and one *Amphipyra tragopogonis*. I think a great many insects must be lying over in the pupal stage, as they, not only have not come to sugar, but seem absent altogether. During the seven weeks' holidays, I worked the sand hills regularly, whenever the weather permitted, beating the roots, scraping, etc., and sometimes did not see a Macro the whole day, where, under the same circumstances last year, I should have seen hundreds of the commoner sorts, *T. pronuba*, *T. orbona*, *Xylophasia monoglypha*, etc. There have been one or two exceptions, as there always seem to be every year. *Smerinthus ocellatus* larvæ have been very much commoner than usual, *S. populi* the reverse. *Dicranura vinula* has been very plentiful and *Agrotis cursoria* was abundant for a week or two. Amongst the Rhopalocera, *Satyrus semele* and *Argynnis aglaia* were less abundant than usual, while among the Bombyces,—*Bombyx quercus* and *Orgyia fascelina* larvæ were in larger numbers than usual during April and May. I have seen a good many larvæ of *Bombyx rubi* lately (Oct.). *Liparis salicis*, fairly common. *Notodonta dictæa* and *N. ziczac*, generally pretty well represented in the larval state, very scarce. I have only seen 2 of the latter. Among the Noctuæ, *Leucania littoralis* larvæ were very abundant in May at Lytham, and I noticed, in collecting them, that they were almost all of them in the star grass quite close to the sea, in fact, where the spray comes well over in the winter, only finding odd ones inland. I am sorry to say I had rather bad luck in breeding them, so many got away or were eaten by the others; at all events they disappeared. The full grown larvæ appear to be able to get through anything they can see daylight through. *L. pallens* and *L. impura* were pretty plentiful. All the *Mamestræ* were scarce this season; also *Miana strigilis*, *M. fasciuncula*, *M. literosa* and *M. bicoloria*. The *Caradrinæ* were well represented by *C. cubicularis*, but I did not manage to secure any of the others. All the AGROTIDÆ were very scarce with the one exception of *cursoria*. *Nigricans*, which we often get quite black, was entirely absent; of *præcox* I only secured 6 specimens, of *valligera* a few, of *tritici* very few comparatively, of *aquilina* only one, *segetum* and *suffusa* I have not seen, although, last year they were very common, especially the latter; *exclamationis* scarcer than usual, *corticea* I did not get at all. We had a few fine nights in August when I managed to secure a few *Luperina testacea* and *L. cespitis* at the lamps, the latter seeming to be in greater numbers than I have ever seen them here before, and, if the weather had held out, I should have got a nice series, as it was I got thirteen of them. The NOCTUIDÆ were scarce, with the exception of *xanthographa*, which, as usual, was in great force. The TÆNIOCAMPIDÆ were all very much scarcer than usual. I took a few *gracilis*, and 3 or 4 *opima*, but not *incerta* or *stabilis*, and the few I got were off the sallow; I could not get them to sugar. I have seen a few *Orthosia lota* during the last few weeks. In August I took a few *Epunda lichenea* by beating. The HADENIDÆ very scarce. *H. dentina* I have not seen for two years; in 1888, I could have taken them in hundreds on sugar, *Cucullia umbratica* was also very plentiful in 1888, but I have only taken one this year. *Plusia gamma* has been scarce this year, last year they swarmed. I also took *Phytometra ænea* flying in the trees in July. I have seen very few Geometers, *Cidaria testata* has swarmed all over the sand-hills and *Ennomos tiliaria* has been fairly plentiful on the lamps. This being my first year among the Micros it has been quite new ground to me. I have found the habitats of some interesting species:—*Ephippiphora populana*, *Choreutes scintilulana*, *Peronea aspersana*, *P. hastiana*, *Eupœcilia vectisana*, *Sericoris litterana*, *Pterophorus lithodactyla*, *Anerastia lotella*, and *Hypermecia cruciana*, which I understand is the dwarf sallow form of *H. angustana*. *Tortrix fosterana*, *T. podana*, *T. heperana*, etc., *Peronea sponsana*, *P. schalleriana*, *T. comparana*, etc., *Teras caudana* and its varieties, *Grapholitha trimaculana*, *Ephippiphora scutulana*, *Aspis udmanniana*, *Sericoris cespitana*, *S. rivulana*, *S. urticana*, *S. lacunana*, *Sciaphila subjectana*, *Grapholitha nigromaculana*, *Eupœcilia dubitana*, *E. atricapitana*, *Pyrausta purpuralis*, *Pyralis farinalis*, *Harpipteryx xylostella*, *H. nemorella*, *Depressaria nanatella*, *arenella*, *propinquella*, *subpropinquella*, *rhodochrella*, *liturella*, *conterminella*, *angelicella*, *ocellana*, *yeatiella*, *applana*, *ciliella*, *badiella*, *heracleana*, *Gelechia marmorea*, *umbrosella*, *populella*, *sororculella*, *temerella*, *terella*, *Coleophora genistæ*, *Betrachedra præangusta*, *Lithocolletis alnifoliella*, *Cemiostoma laburnella*, and a number of others, almost all taken on the sand hills. I have a nice series of *Peronea hastiana* coming out now, from larvæ gathered in August and September, some with the forewings purple, others grey, purple with a white streak in the middle, purple with a white streak on the inner margin, etc.—T. BAXTER, St. Anne's Collegiate School, St. Anne's-on-the-Sea, Lancashire. *November*, 1890.

Guernsey and Sark.—Referring to Mr. Luff's note (*ante*, p. 163) on *Eubolia peribolata*, Mr. Hope Alderson and myself, wishing to make acquaintance with this species, planned to have a few hours in Sark, where, I believe, the species is to be obtained more easily than in Guernsey. Going over by an excursion steamer on September 19th, an unfavourable day, much too cold and windy for any day-flying species to be met with in any abundance, we managed to secure three specimens, of which one was too worn for the cabinet. These we found flying over the common furze, on the sloping sides of the cliffs above the Havre Gosselin, and, had we been a week or two earlier, we should doubtless have secured a good series. During the next few days I secured a very fine series of *Polia flavicincta*, freshly emerged, at rest on the rough stone walls near St. Sampson's, in the early morning. These specimens are much more richly mottled and generally darker, with more orange markings, than any I have seen in England. "Sugar" was as usual this autumn of very little use, but I was fortunate in securing a very fine *Caradrina ambigua* on September 22nd, on some sugared flower heads at St. Sampson's. This is the third specimen of this rarity in my cabinet, the two others having been taken, also at sugar, in the Isle of Wight in August, 1888.—ALBERT J. HODGES, 2, Highbury Place, N. *November*, 1890. [The specimens of *P. flavicincta*, taken by Mr. Hodges are particularly fine. Some specimens he gave me are by far the finest examples of the species I have seen.—ED.]

Epping Forest.—The season opened on the 2nd February with *Phigalia pedaria* (*pilosaria*). A fortnight later, *Hybernia marginaria* (*progemmaria*) and *Anisopteryx æscularia* appeared at light, and continued on the wing until the middle of April. During the first week of April, the sallows were in full bloom, *Pachnobia rubricosa*, *Tæniocampa gothica*, *T. incerta*, *T. stabilis* and *T. pulverulenta* (*cruda*) were abundant. One specimen of *T. gracilis* was taken on the 16th April. During the last fortnight of the month and the first week of May, the following insects were noticed flying round the sloe blossom:—*Eupithecia pumilata*, *Anticlea badiata*, *A. nigrofasciaria* (*derivata*) and *Cidaria suffumata*, together with an occasional *T. gothica* and *Xylocampa areola* (*lithoriza*). The first brood of *Selenia bilunaria* (*illunaria*), in company with *Cilix glaucata* (*spinula*) and *Hemerophila abruptaria*, was flitting about the glades at sunset. Daywork was commenced on the 4th May. The day being rather cloudy *Lycæna argiolus* was not abundant. *Syrichthus malvæ* (*alveolus*) was the only other butterfly noticed. One *Drepana cultraria* (*unguicula*) was driven out by the beating stick, but that species was not netted till a week later, when it was taken in company with *D. lacertinaria* (*lacertula*), *D. falcataria* (*falcula*) and *D. binaria* (*hamula*). The middle of the month yielded, by searching tree trunks, *Acronycta* (*Cuspidia*) *psi*, *Tephrosia consonaria*, *T. biundularia* and *Coremia designata* (*propugnata*), while among other species obtained by beating were *Lithosia sororcula* (*aureola*), *Spilosoma mendica*, *Venilia macularia*, *Iodis lactearia*, *Ephyra punctaria*, *E. linearia*, *Acidalia remutaria*, *Melanthia ocellata*, *Coremia unidentaria* and *C. ferrugata*. *Euchlöe cardamines*, *Argynnis euphrosyne*, *Nisionades tages*, *Phytometra viridaria* (*ænea*), *Ematurga atomaria* and *Panagra petraria* were flying plentifully in the sunshine, and *Hepialus lupulinus*, *Apamea basilinea* and

Noctua plecta, at dusk. June began and ended well, but the middle of the month was rather a blank. The first half yielded, by beating, *Eurymene dolobraria*, *Lomaspilis marginata*, *Larentia didymata* and *L. viridaria* (*pectinitaria*); and at dusk, *Hepialus humuli*, *Xylophasia rurea* and *Ligdia adustata*. Sugaring was commenced in earnest on the 27th June, and among the first visitors were, *Leucania lithargyria*, *Xylophasia lithoxylea*, *X. monoglypia*, *X. hepatica* (of which a very fine series was taken), *Dipterygia scabriuscula* (*pinastri*), *Miana fasciuncula*, *M. strigilis* (with its var. *æthiops*, which was much more abundant than the type), *Noctua augur* and *Euplexia lucipara*. At dusk, on the closing days of the month, *Metrocampa margaritaria*, *Acidalia aversata*, *Eupithecia rectangulata* (dark form) and *Melanthia bicolorata* (*rubiginata*) were captured. The first half of July produced at sugar, *Thyatira batis*, *T. derasa*, *Leucania comma*, *L. impura*, *Axylia putris*, *Mamestra sordida*, *Miana arcuosa*, *Caradrina morpheus*, *C. taraxaci* (*blanda*), *Rusina tenebrosa*, *Agrotis segetum*, *A. exclamationis*, *Noctua triangulum*, *N. brunnea*, *N. festiva*, *Mania maura*, *Dicycla oo* (1 specimen), *Calymnia affinis* and *Aplecta nebulosa*. One specimen of *Cossus ligniperda* and a splendid *Hylophila bicolorana* (*quercana*) also visited sugar, whilst on the wing. *Plusia iota*, *P. chrysitis*, *Uropteryx sambucaria*, *Angerona prunaria*, *Pericallia syringaria*, *Boarmia repandata*, *Phorodesma pustulata* (*bajularia*), *Hemithea strigata* (*thymiaria*), *Acidalia imitaria*, *Cidaria dotata* (*pyraliata*) and *C. associata* (*dotata*) were secured. The last fortnight of the month was not so productive, and the principal fresh species taken were *Hepialus hectus*, *Leucania pallens*, *Orthosia upsilon*, *Calymnia diffinis*, *C. trapezina*, *Crocallis elinguaria*, *Acidalia bisetata* and *Eupithecia oblongata* (*centaureata*). August was a bad month, and, owing to the weather, little was done. The principal insects taken by beating were *Pseudoterpna pruinata* (*cytisaria*), *Eugonia quercinaria* (*angularia*), *Cidaria immanata* (light and dark forms) and *C. testata*; at sugar, *Noctua plecta*, *N. rubi*, *N. umbrosa*, *N. baia*, *N. xanthographa* and *Catocala nupta*; and at light, *Eugonia alniaria* (*tiliaria*). September produced, at light, *Gortyna ochracea* (*flavago*), *Hydrœcia micacea*, *Neuronia popularis*, *Anchochelis lunosa*, and *Plusia gamma* (only two of which have been seen during the year); and at sugar, *Tapinostola fulva*, *Triphæna comes* and *Calymnia affinis*.—ARTHUR F. BAYNE, Elmsleigh, Northumberland Park, Tottenham. *November*, 1890.

NOTES OF THE SEASON (COLEOPTERA).—*Hastings District.*—By evening sweeping, I have taken the following:—*Anisotoma scita*, *A. grandis* (1), *A. litura* (few). *Agathidium varians*, *Phalacrus caricis*, *Scymnus capitatus* (1), *Choleva watsoni*, *Dasytes plumbeus* and *Abdera bifasciata* (1). At Pett Marshes, by sweeping the water plants, I took a single specimen of *Telmatophilus sparganii*, 2 *Bagous cylindricus* and several *Stenus binotatus*. *Hydronomus alismatis* was very abundant, sometimes there were thirty in my net at one time. At Camber, I have taken a few *Bledius atricapillus* and several *Dyschirius salinus*. On the cliffs, at roots of grass in sandy places, I found a few *Orthochætes setiger*, *Tychius picirostris*, *Carcinops minima* and *Otiorrhynchus rugifrons*, this last species was very abundant.—A. FORD, Alexandra Villa, Braybrooke Road, Hastings. *October*, 1890.

Bath District.—In the early part of the season, beetles were tolerably abundant at Bath, but many species usually met with were conspicuous by their absence. Beating produced *Telephorus translucidus* and *alpinus*, *Toxotus meridianus*, *Clytus arietis* and *mysticus*, *Polyopsia præusta*, *Ochina hederæ*, *Bembidium quinquestriatum* and many others. Under stones in a water course, *Dianous cærulescens* was abundant. Carrion baits produced numerous SILPHIDÆ, representatives of the genus *Necrophorus* being especially abundant. The species were *N. humator*, *ruspator*, *mortuorum*, *interruptus* and *vespillo*. There were also a few specimens of *Necrodes littoralis*. Among the specimens of *Necrophorus ruspator*, were several that very closely resembled *N. interruptus*, the anterior band on the elytra being narrowed and interrupted. At the end of August, I visited Burnham, Somerset; and, although beetles are usually very abundant there at this period of the year, on this occasion, scarcely any could be found. This applies equally to both terrestrial and aquatic species; among the latter, I only took a few *Hydaticus transversalis* in addition to those usually found everywhere. I walked to Brent Knoll to see if the same scarcity extended to a more inland district, but here again the only species not universally common was *Amara ovata*. On the sandhills by the sea, *Cicindela maritima* was however common enough, and I noted that an easy way to capture them, was to search the sandhills carefully as many were to be found nearly buried in the sand, and some entirely so, their whereabouts being revealed by a little hole or disturbance in the usually smooth surface of the sand. As I could get almost any number, I looked for varieties, expecting to find some specimens that would resemble *hybrida*. In this I was disappointed, but I found several decidedly green in colour and one specimen remarkably so, being almost as green as *C. campestris*. Since my return home, I have taken *Amara consularis* freely. It occurred under weeds in a field of mangolds, in company with one or two *A. bifrons* and *acuminata*. I collected some specimens of *Amara ovata*, which occurs here in one particular spot near the river, and nearly all the specimens had very light tibiæ, doubtless owing to immaturity, but it shows that this character cannot be relied upon to determine the species. On the whole, my impression is that the past season has been one of unusual scarcity at least as far as Coleoptera is concerned.—ROBERT GILLO, Bath. *October*, 1890.

AUTUMN NOTES.—*Sheffield.*—Between the end of September and the end of October, I took, in the Sheffield District, larvæ of *Eupithecia nanata* and *E. minutata* on heath, *E. assimilata* on wild hop, *E. lariciata* on larch; *Phoxopteryx ramana* (*lactana*) in turned-down aspen leaves; *Coleophora laripennella* on *Chenopodium* seeds, *C. virgaurella* on seeds of golden rod; *Lithocolletis roboris* in oak, *L. salicicolella* in sallow, *L. faginella* in beech, *L. pomifoliella* in wild apple, *L. emberizepennella* in honeysuckle; *Cemiostoma scitella* in wild apple; *Nepticula aucupariella* in mountain ash, *N. argyropeza* in aspen leaves. I also found mines of *N. myrtillella*, but I was late for them.—J. BATTY, Sheffield. *October 31st*, 1890.

Isle of Wight.—This autumn seems to be a very bad one for collecting, especially at ivy-bloom. I have paid half-a-dozen visits to it during the past ten days, and have had very suitable evenings, warm, dark, damp, breezy and still, but the result seems the same under all conditions. *Phlogophora meticulosa* was very common on October 22nd, 23rd, and 24th, but the very severe frosts of the 26th and 27th, put an end to them. A few *Miselia oxyacanthæ*, *Cerastis vaccinii*, *C. spadicea*, 2 or 3 (freshly emerged) *Plusia gamma*, *Scopelosoma satellitia*, and a few worn *Anchocelis pistacina* and *Xanthia ferruginea* complete the very poor list. Sugar was tried twice, viz., on October 23rd, on the Downs, with the result of one belated *Luperina testacea*, and 30th, in the woods, when two fine fresh *Agriopis aprilina* were taken, surely a very late date to find this species in fine condition.—Albert J. Hodges, 2, Highbury Place, N.

Devon and Somerset.—I have spent a month in Devonshire and Somersetshire. Night after night I tried sugaring in the most likely localities and I never got more than one moth in the evening. The ivy was magnificent, and scented the air, but till the last evening at Cheddar I took nothing. On this evening a good *Xylina semibrunnea* was my only prize.—E. Bazett, Reading. *October 27th*, 1890.

Somerset.—Ivy will soon be a mass of blossom hereabouts, but insects are very scarce. It is yet a little early for the bulk of insects at ivy, a few *Xanthia citrago* and *Polia flavicincta* have been taken at sugar, but not in such numbers as last year. No *Sphinx convolvuli* up to the present date (September 26th). Collecting has been a little better here during the past week.—J. Mason, Somerset. *October 20th*, 1890.

Kent.—Larvæ of *Emmelesia unifasciata* have not been scarce on *Bartsia odontites*, and, I think the insect would be found to be generally common, if searched for in the larval state. How late the season is, and how far this lateness has been prolonged, was evidenced on Saturday (October 18th), when I noticed *Chesias spartiata*, common and in fine condition, whilst a few days ago I took *Cidaria russata*. *Oporabia dilutata* is only just appearing, also *Cerastis vaccinii*. A week ago, not one of the latter occurred among the other visitors at sugar.—C. Fenn, Burnt Ash Hill, Lee. *October 20th*, 1890.

Barnsley.—During the two or three weeks of fine summer weather we had in August, *Penthina sauciana* and *Hypsipetes elutata* occurred in profusion on our moorlands. On September 10th, I took *Cloantha solidaginis* and *Oporabia filigrammaria* from the bare decayed twigs of fir-trees. Both species have deposited ova, which have changed colour, but remain unhatched. Can any one enlighten me as to the life histories of these species?—J. Harrison, Barnsley. *October 22nd.*

Winchester.—As to ivy, I have taken nothing this year, but the nights have been so cold that I have hardly taken the trouble to visit it. Usually I take *Cidaria psittacata* in some numbers, and all the common autumn Noctuæ in plenty. The simplest method, after taking a look over a bush, is to beat it into a beating tray, as very few Noctuæ fail to fall when disturbed. Ivy blossom is just as capricious as "sugar," sometimes an apparently good night is blank and *vice versâ*. I was once out at a bush near Brockenhurst, when the air seemed alive with approaching insects; chiefly *Agriopis aprilina*, *Orthosia macilenta*, *O.*

Iota and other common insects, but in vast and wonderful abundance: a touch of the tree filled the beating tray.—G. M. A. HEWETT, Winchester. *October 29th*, 1890.

North Wales.—Ivy has been very unprofitable this autumn as has also "sugar." Six visits to the former have only resulted in the capture of 6 *Cerastis vaccinii.*—J. E. R. ALLEN, Ruthin. *November*, 1890.

Clevedon.—Insects have not been so plentiful as usual at ivy this autumn, and I have only taken one specimen of *Dasycampa rubiginea* up to this date, but hope to get more should the weather keep mild.—J. MASON, Clevedon Court Lodge, Somerset. *November 9th*, 1890.

Darlington.—Ivy is a failure as usual in this district though I did better than I ever did before.—WM. MILBURN, Darlington. *November*, 1890.

SETTING LEPIDOPTERA.—It is with some diffidence that I write this article, for I am well aware that it might easily have been placed in far worthier hands than mine; but our Editor has specially asked me to do so, and this must be my excuse for appearing in the character of a reformer before the readers of this Magazine. That "anything worth doing at all is worth doing well," is an old axiom, which it would be as well to bear in mind with regard to setting insects, and in fact to entomological work generally. I have known it stated on more than one occasion, that setting is quite a minor consideration, and that fine condition of specimens is all that is necessary in a collection; but surely this is absurd. The very setting of an insect in some bizarre manner is quite sufficient to alter its apparent character, and, if all Lepidoptera were pinned and set in the same style, many difficulties would be removed from the path of determining closely allied species. Take a case with which we are all familiar. A box of insects is received from a correspondent; the specimens are good enough, but the pins are inserted at all angles, and the moths themselves are perfectly flat set, or their wings droop at such an angle as to touch the paper beneath them. When these are placed in the cabinet, they contrast peculiarly with the others, to the advantage of neither; with the result that they have to undergo the deteriorating effects of re-setting. This is, at the best, an uncertain cure, for they are always liable to revert to their old condition. High, flat setting, in my humble opinion, is the worst style of any, and besides its unnatural appearance, affords a great loophole for the introduction of foreigners as British. If a drawer is properly airtight and kept well supplied with napthaline or camphor, mites are an impossibility; then why should we employ a method which detracts from the beauty of our insects? When I receive these "skyed" specimens, the only thing to be done is to shorten the pins beneath them; this is objectionable, for it renders them less easy of removal, and, with black pins, is a matter to take into account. High, flat setting seems to be the last resort of those whose cabinets are of the worst description, where mites and other vermin roam at will about the drawers, and are only kept at bay, like "the fox from the grapes," by the height of the specimens above the paper. I imagine the perfection of setting to be when the insect is arranged in a natural manner, with wings sufficiently expanded to exhibit all the characters and markings, not too flat nor yet too sloping, and also showing no trace of brace marks or needle holes. Passing by the various methods in use, such as double card braces, double braces on ordinary cork boards, triangular pieces of card, from two to six to each specimen, and the wonderful block system of thread and paper combined. I think, if anyone will have the patience to follow the system I hope to explain, they will, with a little practice, find it better than any; and that the result will show that Lepidoptera may be set as expeditiously and in finer style than by any other way. I am perfectly aware that if a collector has employed any system, however peculiar, for years, he may have acquired a perfection in practice, which would favourably contrast with the style I propose, but my object is not to appeal to these, but to beginners, who find some difficulty in setting their captures as they should be set, either for their own collections or to send to correspondents. Now for the details:—First and foremost are the boards. These should be of the kind we buy at any of our leading naturalists, but the objection to all of them is this—they are nearly all too rounded, with the result that we have a small insect on a large board, and thus a good deal of room is unnecessarily wasted and expense incurred; for the price of the board is in the ratio of its size. Large species, like *Acherontia atropos*, the big Sphinges, the larger Bombyces, and also *Catocala nupta* and its allies, take good-sized boards, but they need not be so wide as those at present in use, if they were flatter. Our biggest moths, and they are few enough, rarely cover more than 4½ inches. The grooves should be of two widths in all the sizes (from 5 to 1½ inches expanse), that is to say rather wide and deep for Bombyces, Sphinges, Noctuæ, etc., and narrower and more shallow for butterflies, Geometræ and Micros. The groove, generally speaking, should be only wide enough to easily or loosely hold the thorax of the insect. Boards should never be papered; defects in the cork are thus covered up and they are incapable of being washed occasionally with dilute carbolic acid, to keep them free from mites. Another objection is, that when the pin is withdrawn, it often leaves a roughness on the surface of the paper. The sizes of boards required are: 5 in. (2), 4 in. (2), 3½ in. (3), 3 in. (4), 2½ in. (6), 2 in. (12), 1¾ in. (12), 1½ in. (12), 1¼ in. (12), 1 in. (10), ¾ in. (8), ½ in. (4). The numbers in brackets show the numbers required of those sizes which are the most useful. These will set anything, from *Papilio machaon* to the end of the Tortrices and nearly all the Tineina. The first thing is to pin the insect; and some directions are necessary on this head, for, if pinning is perfectly done a great step is gained. Lepidoptera generally die in one of two attitudes; the first, most peculiar to butterflies and Geometræ, is with the wings closed above the thorax, and the other is the reverse. The first is the easier to deal with. Take the insect (by the legs) gently between the thumb and first finger of the left hand, and, with the right holding the pin, pierce the thorax in the centre, bringing out the point of the pin between the last pair of legs beneath. This will be at a slight angle, the head of the pin rather sloping forwards, the point projecting *about* one-third of an inch beneath. Now, with the pliers, give the insect a gentle squeeze at the bases of both fore wings simultaneously; this loosens the muscles in those with wings raised above the thorax, and will cause those which died in the reverse attitude to assume the same position. Insert the pin in the middle of the groove, inclining very slightly forwards, and pass a setting needle down both sides of the thorax and abdomen to draw the second and third pairs of legs out of the way of the wings. Press the pin down until the insect rests in the groove, with the bases of the wings beneath very slightly raised above the level of the board. The next process is to apply the spanners, and first we must describe what these instruments are. For butterflies (except *Lycæna* and *Polyommatus*), Sphinges, Bombyces, Noctuæ, and the smallest Geometræ, the most useful is the quill; and the way to make it is as follows. Take an ordinary quill and cut a piece out of it about 2 inches (or 1½ inches) in length, taking care to allow the convexity of the quill to run equally level from end to end through the middle. This slice of quill should be graduated to a point. Through the broadest end pass a long stout needle and fasten it to the quill with sealing-wax or with a cube of cork glued tightly; the top of the needle to be headed with sealing-wax. We have now a movable brace, which, when pressed on the wing, holds the costal nervure tightly, but, from its rounded form does not in the slightest degree mark the wing. The other kind of spanner is for smaller and weaker winged insects, and is made thus: Take an ordinary bristle, such as is used in clothes brushes; it must be stiff but perfectly smooth (passing it through the fingers will discover this), and about an inch or an inch and a half in length. Take a long darning needle and, with a little sealing-wax, affix the bristle by one end to it, about half an inch from the point. The angle formed by the bristle with the needle should be slightly obtuse. The advantage of this bristle spanner is the little space occupied by it on the wing-area of small species, which would be half covered by the quill. We will now suppose the insect to be pinned properly, the head of the pin slightly pointing forwards, and the wings either lying flat on the boards or gently raised above them. Take a spanner and insert the point of the needle in the cork as near to the groove as possible, with the quill point pressed against the cork, beyond the costa of the fore wing, and near the base, gradually pressing the spanner forward till the pressure is exerted on the costal nervure which it will hold tightly. Then do the same with another spanner on the other side of the thorax; the moth or butterfly now lies on the board, firmly held in its place by the spanners. Take a setting needle in the right hand, and by very gently pressing the head of the spanner needle backwards with the left, the pressure on the costal nervure is diminished, and a slight touch with the setting needle at the extreme base of the wing will cause it to expand as far as is deemed necessary; and the same with the hind wing. Release the head of the spanner from the pressure, and the wings remain in their places as desired; then do the same with the wings on the other side. The insect now assumes on the board, held by the spanners, the exact position we require it to retain when set, and to complete the process, we have only to put on the braces. These are made of tracing paper (the smoothest is the best), and they should be cut a little in excess of the size of the fore and hind wings combined, between the spanner and the hind margins. A rectangular or rhomboidal shape is the best, but must entirely cover the wings and fringes, and it is as well to cut a sufficient number before commencing operations. On the right hand side, for example, run a pin through the bottom angle of the brace and pin it through the cork close to the anal angle of the hind wing, pressing the pin slightly backwards towards you; the second pin is inserted as near the costa (next the spanner) as you can; press this slightly forwards or away from you, this tightens the brace and holds the wing in its place. Two other pins, one inserted at the apex of the fore wing and the other at the angle formed by the fore and hind wings, is all that is necessary, and when this is repeated on the other side, the spanners can be removed for use on the next specimen. Arrangement of fore legs and antennæ may now be done, and the transparency of the brace shows if anything is out of order, when, by replacing the spanners it can be rectified. Braces may be used twice, but be careful to reverse or turn them over, lest the roughness of the previous pinholes should mark the wing. When the insects are set, leave them on the boards until thoroughly dry. This may be ascertained by touching the body with a setting needle. If the abdomen appears perfectly hard and does not yield or bend, the insect is ready to be removed, but do not be in too great a hurry to effect this; it will save much subsequent disappointment. In conclusion I have only to say that, although the process under description appears a lengthy one, it is really not so, as from 20 to 30 insects may be set out in an hour. If I have been the means of helping anyone to improve their style of setting and the condition of their specimens, I shall feel I have not written in vain. Any questions on the subject I shall be happy to answer by letter. The pins I use are black with small heads. Nos. 4 and 6 for very large insects. Nos. 7 and 8 for Butterflies, Bombyces, Noctuæ and large Geometræ. No. 10, small Butterflies, Geometræ, Pyrales and large Tortrices. No. 17, Tortrices in general. Nos. 17 and 18, Tineina.—C. FENN, Eversden House, Burnt Ash Hill, Lee, Kent. *October 16th*, 1890. [The only addition I would suggest to Mr. Fenn's most explicit note is, that when pinning insects on the boards, it is advisable to look down the board to see if the pins are in line.—ED.]

NOTES ON SOME MACRO-LEPIDOPTERA, USUALLY OF COMMON OCCURRENCE, BUT RARE IN THE NEIGHBOURHOOD OF SHEFFIELD.—Although one or two of the localities in the immediate district of Sheffield (and of which I here only intend to treat) produce many local species, and some of them abundantly, yet many of the commoner species, which are usually abundant elsewhere, are exceedingly scarce and of rare occurrence. I may here state that by the immediate neighbourhood of Sheffield I embrace anywhere within a four mile radius from the centre of the town.

Among the DIURNI, we are very scantily represented, and this is by no means an enviable locality for those who only take an interest in this beautiful—but in England small—portion of lepidoptera. Upon the authority of some of our old local entomologists, I find that at one time and the other during the last forty or fifty years some thirty-five species of butterflies have been caught close to Sheffield, but of these only a dozen or less are now to be seen year by year and fairly commonly. These are the three "*whites*," *A. cardamines*, *V. urticæ*, *atalanta* and *cardui*, *S. janira* and *hyperanthus*, *C. pamphilus*, *L. alexis*, and *H. sylvanus*. But even of this meagre list some are rare and will be noticed below, together with other common species scarce in this locality. *Vanessa io*, very rarely taken or to be seen. *V. atalanta*, rare, but commoner than the preceding. *V. cardui*, when common throughout the county generally fairly abundant here, but rare at other times. *Satyrus egeria*, *megæra*, and *tithonus*, all rare, the last exceptionally so; indeed, I have never heard of its capture in the neighbourhood, but of course may be mistaken. *S. hyperanthus*, local and uncommon. *Polyommatus phlæas*, odd ones only to be seen at long intervals. *Hesperia sylvanus*, rare, except in one locality.

Having briefly enumerated a few of the Rhopalocera, I will now endeavour to do similarly with the moths, only, however, picking out the most noticeable in their rarity compared with their usual abundance elsewhere. *Euchelia jacobææ*, very rare. *Chelonia caja*, scarce and uncommon; I have never seen an imago alive around here, and only find about three larvæ a year on the average, and sometimes none. *Arctia fuliginosa* and *mendica*, exceedingly rare now; formerly much commoner. *Liparis auriflua*, this species is very common outside Sheffield in some places, but within four miles is never to be seen or taken. *Orgyia antiqua*, occasionally taken. *Bombyx neustria*, excessively scarce; it is said to occur at Sheffield upon the authority of Mr. Arthur Doncaster in Mr. Porritt's *Lepidoptera of Yorkshire;* but so far as I can gather from other collectors they have never seen it in this neighbourhood. *Dicranura vinula*, by no means common. *Pygæra bucephala*, imago scarcely ever seen, and the larvæ very rarely. *Diloba cæruleocephala*, never seen within four miles of here; rather common further out. *Bryophila perla*, rare. *Leucania conigera* and *impura*, not common. *Hydræcia nictitans* and *micacea*, rarely to be seen or taken. *Xylophasia lithoxylea*, not common. *X. hepatica*, rare. *Apamea basilinea*, not very common. *Miana strigilis*, the type never seen or taken; the variety *æthiops* very abundant, and var. *præduncula* not rare. *M. fasciuncula*, *literosa*, and *furuncula*, all more or less rare, especially the last mentioned. *Grammesia trilinea*, excessively scarce; I have never seen a specimen here yet. *Triphæna orbona*, not at all common. *Anchochelis pistacina*, has never been taken or seen to my knowledge. *Agriopis aprilina*, *Phlogophora meticulosa*, and *Euplexia lucipara*, all rare and of uncommon occurrence. *Hadena chenopodii*, *adusta*, *protea*, and *pisi*, all rarely seen or taken. *Plusia chrysitis*, not common. *Urapteryx sambucata*, rare. *Selenia illunaria*, very scarce. *Boarmia rhomboidaria*, was common all over a few years ago, but hardly ever to be seen now. *Acidalia scutulata*, *bisetata*, *incanaria*, and *aversata*, all very rare except the last, which, however, is but rarely taken. *Abraxas grossulariata*, hardly ever to be found in any stage. How is it? *Hybernia leucophæaria*, rare. *Camptogramma bilineata*, very rarely taken or seen. *Eubolia cervinaria*, very rare, even when the foodplant is abundant. *E. palumbaria*, not at all common. *T. chærophyllata*, scarce, except in one locality; the foodplant occurs commonly in several places, but the insect only in one.

I have now given a short list of those species which appear to be the most noticeable, and sufficient, I think, to convince the reader that, for no apparent reason, many insects, common in one locality, and generally so everywhere, may yet be entirely wanting in another one, although no striking dissimilarity between the two exists, so far as outward appearance, situation and vegetation are concerned.

There can be no doubt that the huge factories, collieries with their hideous accompaniments, rows of jerry-built colliers' dwelling-houses, and other nineteenth century *improvements* (?), which are hemming in and around Sheffield on every side, are playing dreadful havoc with the insect fauna and flora throughout the district; and while the owners of these works are allowed to belch forth sulphur and other noxious vapours from their hundreds of chimneys, darkening and polluting the atmosphere all around, there is little to hope for in this district in the future, so far as entomology is concerned, unless this smoke abomination is prevented, as it could be, to a very considerable extent.—A. E. HALL, Norbury, Sheffield. *October*, 1890.

KILLING LEPIDOPTERA.—Having read the remarks in the July number of the *Record* upon the use of ammonia as a method for killing lepidoptera, I determined to give it a trial I procured a wide-mouthed bottle with a hollow stopper. Such bottles can be procured, in several sizes, at any chemist's, and are, I think, used for potassium. Inside the stopper I placed a small sponge, and in the bottle a piece of blotting paper to absorb any superfluous moisture. Before starting for a day's collecting, a few drops of strong liquid ammonia are poured over the sponge, and the bottle is ready for use. Care should be taken that the bottle be not left without the stopper longer than is absolutely necessary for introducing the insect, as the strength is soon lost. I have not found that the bottle gets damp, provided that only a few drops of ammonia are used. Insects killed by this means remain beautifully relaxed, which I find a great boon, being often unable to set my captures at once. I cannot claim any merit for thinking of this method, for a brother entomologist has used the same sort of bottle for many years, with this difference, the agent is chloroform instead of ammonia.—J. H. D. BEALES, Arthur House, Cliftonville, Margate. *October 15th*, 1890.

Noticing in the *Entomologist's Record* several items *re* "Killing Lepidoptera," I have been waiting to see if any of your correspondents mentioned benzine as an agent for killing. I have heard that rectified benzine sold by chemists is very good to use. Can any of your correspondents give me any particulars as to its use?—G. A. BIRKENHEAD, Downs View, Penarth, Cardiff.

I have had two very good illustrations during the summer of the advantage of ammonia over cyanide of potassium and chloroform. A personal friend of mine, who, two years ago, was an enthusiastic user of chloroform, told me that he had used nothing but ammonia since he saw me use it in 1888; whilst another friend who used cyanide of potassium until last year, showing me a rarity, apologised for its being a leg short with the remark "I used cyanide, I hadn't any ammonia." On saying that I thought he always used cyanide, he answered, "Not since I saw you use ammonia." When collectors give up old methods for a new one, there must be something in it. Every one likes his own method best, *because he is used to it*, and as long as the method is a good one, it matters but little what the method is.—J. W. TUTT.

With regard to Mr. Tutt's note (p. 66), about the time that cyanide-killed insects take to dry, I found that specimens of *Metrocampa mar-*

garitata, killed by that means were exactly twice as long on the setting-board as those killed with ammonia. Why this should be I do not know, but it is a "fact." Surely this is a drawback to the use of cyanide when expedition is needed. Again, I was surprised to see in the July number, that some entomologists complain of ammonia taking away the colours of green insects. I have ascertained that it does *not* make the slightest difference to *Metrocampa margaritata*, *Geometra papilionaria*, *G. vernaria*, *Aplecta herbida*, or *Tortrix viridana*. All the above, except *vernaria* and *herbida* were bred specimens, and the experiments were made this year. I do not know what the result would be if an ammonia bottle similar to the cyanide bottle were used; it might turn the green insects yellow, I should think. When I said above that it did not make the slightest difference I should have added, "when used the proper way." The method I adopt is to slip pieces of blotting-paper into the chip boxes while the moths are in them, the said pieces of paper having been previously moistened with ammonia.—E. W. Bowell, Hereford. *November 17th*, 1890.

Notes on the Habits of Aglossa pinguinalis.—During September of last year, a gentleman, living in St. Andrew's parish in this island, called on me, and showed me larvæ which he said were in great abundance in one of his greenhouses, and he was anxious to know whether they would be likely to injure the vines. I visited the spot, and found the larvæ very abundant in holes they had made to the depth of about two inches, in the earth which formed the floor of the greenhouse. These holes were lined with silk, forming perfect tubes, which were continued above the surface and there mixed with bits of dead vine-leaves, stems and excrement from the larvæ. The appearance and habits of these larvæ struck me as peculiar, and different to the habits of any insect that I had read of, so I sent some to an entomological friend residing in London, who showed preserved larvæ, with tubes, etc., and read a note on their habits, to members of the South London Entomological Society, and I received the following reply—"It is a beetle larva and feeds upon decayed vegetables—not uncommon. The President (Mr. Billups) is not sure of its name. It was shown to a number of people in the room but no one could give more information." Another friend got one shown to Mr. Billups who said:—"In reply to your query as to the larvæ enclosed for my inspection, as also your very lucid description of the habits of the creature, I perhaps may be able to enlighten you. I have no doubt, from what I can see of the remains of the larva, that it is one of the species of Tenebrionidæ and most probably *Tenebrio obscuras*, but it would be quite impossible to speak positively, as it was crushed in transit" (*in litt.*). In the meantime, I kept a large piece of the earth with a number of larvæ in their tubes, feeding them on cabbage leaves, which they ate very sparingly, and the perfect insect duly emerged in ordinary course, and turned out to be, not a beetle, but *Aglossa pinguinalis*. I then referred to Morris, Stephens, etc., and found—"butter and greasy substances"—given as the food of the larvæ. Mr. F. W. Hawes kindly referred me to Mr. Buckler's very complete life history in the *Ent. Mo. Mag.*, Feb., 1884, where he describes it as feeding in stables, etc., on the sweepings and other garbage, but I see no mention of its habit of making holes in the earth and lining them with silk, probably on account[1] of the hard nature of the floor. I think its appearance in such numbers in a greenhouse (there must have been thousands of larvæ) is worthy of notice.—W. A. LUFF, Mansell Street, Guernsey. *December*, 1890. [This is about as complete an exhibition of the ignorance prevailing about our common species, as one can well imagine. As a member of the South London Society, who may have been present at the meeting, I am quite willing to bear my share of culpability, negligence or ignorance, or all combined.—ED.]

DIANTHŒCIA CÆSIA AND POLIA NIGROCINCTA IN THE ISLE OF MAN.—Along with my friend, Mr. Murray, I had a week in the Isle of Man this year, and had the good fortune to take a nice series of *Dianthœcia cæsia*, also the larvæ of *Polia nigrocincta*. Amongst entomologists who work for these species, the prevailing opinion is that *D. cæsia* is becoming scarce and is the better insect of the two.—GEO. A. BOOTH, Grange-over-Sands. *October* 18*th*, 1890.

DIANTHŒCIA CÆSIA.—By working the Manx coast systematically, I mean night after night, one is almost sure to take a series or two of *D. cæsia*, but I am sure we need never fear that this species and *Polia xanthomista* (*nigrocincta*) are becoming extinct. Our joint result this year, in eight days' stay, was either 6 or 8 specimens of *D. cæsia*, which species was, this year, in particularly fine condition (first week in June).—C. E. STOTT, Lostock, Bolton. *November*, 1890.

OVERLOOKED BUTTERFLIES.—Now that a new butterfly, *Hesperia lineola*, has been added to the British list, I would call attention to the fact that several species closely allied to *Syricthus alveolus* are common on the Continent. Some years ago, I had one specimen of *S. carthami*, a species very closely allied to *alveolus*, sent me by a Mr. Bankhart of Bradford among a series of *alveolus* which he had lately taken. As I did not know the species, and thought it a curious *alveolus*, I sent it to London to be named and have never seen or heard of it since. *S. andromeda* and *S. carthami* are very much alike. *S. alveus* and *S. sao* are also closely allied to them.—W. REID, Pitcaple, Aberdeen, N.B.

HABITS OF ACROLEPIA AUTUMNITELLA.—Larvæ of *A. autumnitella* are to be found in mines which cause conspicuous greenish-white blotches in the leaves of *Solanum dulcamara*, especially in those parts of the plant which are most concealed from view. They are generally full-fed about the middle of September (I have however found the larvæ in October), and spin beautiful spindle-shaped cocoons, made of an open network of brownish silk—something like the cocoon of *Chrysocorys festaliella*. The moths emerge in 2 or 3 weeks.—N. M RICHARDSON, Monte Video, near Weymouth. *November*, 1890.

FOODPLANT OF CATOCALA FRAXINI.—My experience with *C. fraxini* was very much the same, as regards the food, as that of Mr. Hope Alderson (*Ent. Rec.*, p. 185), only not quite so good a result. Last spring, I obtained about 30 eggs of the above species; when they emerged, I put both ash and poplar in with them, seven refused to eat either food, the rest all took to the poplar, until nearly full-fed, when about half of them refused to eat; I again tried them with ash, but they would not touch it, they seemed to have quite made up their minds to die, the rest fed up on poplar, and the first turned in on June 16th, and emerged July 26th; the last turned in July 5th, and emerged August 13th. Altogether, I reared nine very fine specimens.—W. E. BUTLER, Hayling House, Oxford Road, Reading. *November 1st*, 1890.

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[1] I should think it is a natural habit to line the galleries they make with silk.—ED.

TIME OF APPEARANCE OF PLUSIA FESTUCÆ.—During the last two or three years, my experience of *P. festucæ* has been similar to that of Mr. Johnson (*vide Record* for October, p. 184). Toward the end of June, *P. festucæ* and *P. pulchrina* appear flying at dusk over a bed of "Lobel's catchfly"—sown for the purpose—and are taken in fine condition. About the beginning of July, these get scarcer: *P. iota*, and *gamma*, with an occasional *bractea* take their place. And, after every spell of good weather, *iota* may be had newly emerged and in fine condition till late in August, when it gets scarcer, and *gamma* is at its best. A little later *festucæ* may be still found in fine condition and seemingly newly emerged.

This year *festucæ* was specially abundant but there was a decided falling off in the numbers of *gamma*. In 1889, when you walked along any railway embankment, about the end of June, *gamma* rose in dozens, but this year I am sure I did not see a dozen specimens altogether.—HUGH S. DUNN, JUN., Caprington, Kilmarnock, N.B.

MOTHS AT FLOWERS OF TRITOMA UVARIA.—Having last year noticed that many moths were attracted to the flowers of the Red Hot Poker (*Tritoma uvaria*), I naturally expected a rich harvest of insects from the same source this autumn, when, on three plants. I counted altogether a hundred splendid blossoms. In this I was disappointed; for, though the flowers were carefully examined every night, not a moth put in an appearance till the second week in September. Then I only took two specimens of *Hydræcia micacea*, several *Hadena protea*, 2 *Xanthia fulvago* (*cerago*), and a few *X. flavago* (*silago*), *Anchocelis litura*, *Phlogophora meticulosa* and *Triphæna pronuba*. Last year, in addition to these, I took *Agrotis suffusa* and several others.—J. H. D. BEALES, West Woodhay Rectory, Newbury.

CELÆNA HAWORTHII.—During August, I found several *C. haworthii* sitting on the flowers of the ragwort in the daytime, which I have never noticed before.—GEO. A. BOOTH, Grange-over-Sands.

C. haworthii are to be taken off the bloom of *Erica* in the daytime; they have a habit of dropping off the flowers at the approach of the collector, long before he is sufficiently near to box.—J. H. STOTT, Lostock, Bolton.

REARING HADENA GENISTÆ.—It may interest some of your readers to hear, that my experience of rearing *Hadena genistæ* has been, up to the present, just the opposite to that of Messrs. Goldthwaite and Hewett, and Miss Kimber. My friend, Dr. Crallan, last July sent me 50 larvæ just hatched, from which I have about 40 healthy pupæ. The larvæ I lost, died when quite small. I fed them on knot grass, giving them fresh food every day, and kept them, as I do all my larvæ, in a large flower pot, with muslin tied over the top.—WM. FARREN, Fern House, Union Road, Cambridge. *November*, 1890.

PRESERVING AND MOUNTING LARVÆ.—I have principally devoted my attention during this season, to preserving and mounting the larvæ of British Lepidoptera; and give a few hints which may be of service to some collectors. The apparatus, I think, is pretty well known. I always kill my larvæ with the cyanide bottle, but care must be taken, not to leave green larvæ too long in it, as they discolour very quickly. Some green larvæ may be preserved very readily, for instance *Papilio machaon*; others, as *Gonepteryx rhamni*. I have failed with, and should be very thankful for advice as to preserving these. Hairy larvæ are, as a rule, awkward subjects. *Spilosoma lubricipeda*, for instance, I leave in the bottle at least twenty-four hours, and then roll very carefully; the result is excellent. *Orgyia antiqua* is the most difficult I have met with; not only because of the hairs, but on account of the colour, it wants great care in rolling. *Arctia caia*, *Bombyx rubi*, *Acronycta* (*Cuspidia*) *aceris*, etc. are fairly easy. *Cossus ligniperda*, *Diloba cæruleocephala*, *Pericallia syringaria*, etc., are very easy. I tried many experiments with the pupæ of Rhopalocera, and found that the best plan, was to let the insect get fairly well formed inside, then slice one side or the back of pupa, and pull out the partially formed imago. This plan answers with such as *Vanessa urticæ*, *V. io*, etc., preserving the metallic spots beautifully. The food-plants (for mounting) I place in silversand for about a fortnight, but do not heat the sand, as it takes nearly all the colour out. I also mount the life histories on cards of one regular size; a great point, as it gives regularity and symmetry to the collection. A great fault with many who preserve larvæ, is to distend the larvæ unnaturally. In my opinion a nicely preserved, and mounted life history adds greatly to the interest of a collection.—A. QUAIL, 15, Stamford Hill, Stoke Newington. *November*, 1890.

DIANTHŒCIA CAPSOPHILA.—The following may prove of some interest to your readers. On 6th June, 1889, I obtained a number of *D. capsophila* larvæ feeding on *Silene maritima*. I brought them home, and by the beginning of July they were full fed, and entered into the chrysalis state about the 6th of that month. On August 1st, looking into my larvæ cages, I was surprised to find that five had emerged. The larvæ of this species, which I have taken in previous years, have always remained in the pupal state throughout the winter. In the *Young Naturalist*, for September, 1890, p. 171, I see that Mr. John Henderson of Streatham had a similar experience with *D. carpophaga*.—H. SHORTRIDGE CLARKE, 2, Osborne Terrace, Douglas, Isle of Man. *October 24th*, 1890.

TIME OF APPEARANCE OF PERONEA HASTIANA.—I always had an idea that *P. hastiana* appeared in August and many a bag have I filled with heads of dwarf sallow in July in hope of breeding this species, and much to my disgust have never succeeded in getting any but odd specimens. This year I collected, in August, a number of osier tops for larvæ of *Halias chlorana* and was surprised to find a good many tenanted, with apparently newly hatched Tortrix larvæ, which produced in September and October a fine varied series of *P. hastiana*. Tops of dwarf sallow sent me by Mr. Baxter from St. Anne's-on-Sea, during September contained quite small larvæ of this species, and the imagines from these have been appearing continuously ever since, some emerging as late as to-day (December 1st). These were kept under cover (in a greenhouse) and were probably thus hastened some days. Considering how exceptionally mild the autumn was up to November 24th, it would be interesting to know what would be the ordinary time of emergence in a fairly cold autumn or whether the latest pupæ would go over the winter in that stage, and not emerge until the following spring? One can hardly suppose that a large number would naturally be killed off.—J. W. TUTT. *December*, 1890.

GONOPTERA LIBATRIX.—I don't know if it is worth recording, but I placed an example of the pretty *Gonoptera libatrix*, in a chip-box minus food, on August 28th, and there it remained alive for a whole month.—CHARLES OLDHAM, Chelmsford Road, Woodford. [All moths that hybernate might be kept alive under precisely similar conditions at this time of the year.—ED.]

CLOSTERA ANACHORETA.—This species is easily reared, and is extremely prolific. The following table gives the date of the first respectively, of each metamorphosis, of a spring and summer brood:—Emerged from pupa, May 15th, and July 31st. Ova hatched, May 24th, and August 20th. Pupated, July 17th, and September 30th.—J. HERBERT STOTT, Lostock. *October 1st*, 1890.

TREATMENT OF PUPÆ DURING WINTER.—Under "Notes on Collecting," *Record*, p. 180, Miss Kimber has a nice readable notice—but one phrase appears to have been written hurriedly, or it would not have been worded as it is. I refer to that part which says: "Can any lepidopterist give me a few hints as to the treatment of *Eupithecia pulchellata* larvæ during the winter?" No doubt, by now, the larvæ of *pulchellata*, which are full-fed by about the middle of July, have assumed the pupal state, either on the surface of the ground, or in the angles of the breeding cage or box, in a kind of web—requiring no further treatment—and will remain in that state until next May. I have been rearing a few, they were full-fed, and went into pupæ in August, and I don't expect to see the moths until next spring. I have also fed a few *Amphidasys prodromaria* larvæ this year, and Miss Kimber's experience and no doubt, treatment of these pupæ is like mine, and I have put down my failure hitherto to keeping them too dry. This year I am trying the experiment of removing the pupæ into another box, making a firm bottom of earth, and placing the pupæ between two layers of moss, damping the top layer occasionally. I usually lose a large percentage of my pupæ, and I feel certain it is because they are too dry. On the other hand, I have tried the opposite method, and kept the mould, moss, leaves, etc., in the cages, constantly damp, when I found I lost most of them by their becoming mouldy; so now I am trying the happy medium.—JNO. HARRISON, 7 Gawber Road, Barnsley.

First, get your pupæ. Some collectors object to "travelled pupæ." But an insect travels more safely in the pupal than in the larval state. Embedded in cotton wool, and with a liberal allowance of room, few pupæ suffer from a journey; and a good provision of pupæ in variety is an excellent way of ensuring a good season next year. There is a remarkable difference of opinion as to the manner of wintering pupæ. Some insist that they should be kept out of doors. But, as the insects themselves seem to seek shelter of some kind, it seems that a house affords that shelter from various foes which they require. A fire room is certainly the wrong place; but a place offering the degree of dampness possessed by a cellar or larder, seems most suitable. Then, much question is made as to the dampness of the earth in or on which pupæ are laid. In my opinion a distinction should be made, according to the season. In winter when hard frost is to be looked for, the earth should be moderately dry. But when spring arrives, to put your cages out in a warm drizzle occasionally is most desirable. More especially with insects like *Stauropus fagi* and *Notodonta dromedarius*, moisture is required as the period of emergence approaches. Another question arises, about the quality of earth in which pupæ should be kept. My practice is to mix light garden mould with silver sand and cocoanut fibre, in equal parts, and to press the compost down rather firmly. Moss is objectionable as a covering to pupæ, as encouraging insect pests. When it is necessary to bake the compost, in order to destroy these, I have boiling water added first, and then submit to a heat rather above that of boiling water, in a kitchen oven, for 20 minutes. This does not make the earth caustic, but kills all insect life. The cages I use for keeping pupæ in, are of zinc, and what are called wash-ups at the ironmongers. These can be stored one upon another, to save room. When pupæ have been unearthed it is a rule not to bury them again. But this need not hinder a slight covering of some light material, as cocoanut fibre, to prevent their drying up. Some pupæ require more moisture than others, and among these may be named *Petasia nubeculosa* and *cassinea*, *Notodonta dromedarius*, *Bisulcia ligustri*, *Viminia myricæ*, and *Stauropus fagi*. —BERNARD SMITH, Marlow. *December*, 1890.

LEIOPTILUS BIPUNCTIDACTYLA.—I have bred some nice specimens of *L. bipunctidactyla*; I found the larvæ feeding in the flowers of scabious. They are very sluggish, and eat through the bases of several florets. They are thus completely hidden, and, until the flower head is pulled apart, there is no sign of the larva within.—M. KIMBER, Newbury. *October 14th*, 1890.

HABITS OF TAPINOSTOLA CONCOLOR.—The insect flies like *Celæna haworthii*, near the ground, and, threading its way through the long grass, is difficult to obtain really fine. The localities to be worked, coupled with the present season, will quite excuse its almost complete absence in 1890.—SYDNEY WEBB, Dover. *July 25th*, 1890.

I had the pleasure of seeing a very fine *T. concolor* from Captain Vipan, exhibited at the South London Entomological Society at the end of August. It seems to me that *T. concolor* is less robust than *T. fulva*, being more like *T. bondii*, and the forewings are whiter than any form of *T. fulva*.—ARTHUR ROBINSON. *September*, 1890.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*November 20th*, 1890. —The following gentlemen were nominated as officers for the ensuing *year: President* and Treasurer, Mr. J. A. Clark, F.E.S.; Vice-President, Mr. J. W. Tutt, F.E.S.; Curators, Messrs. H. Bellamy and H. Heasler; Librarians, Messrs. T. Gurney and H. Cripps; Council, Messrs. E. A. Newbury, C. J. Boden, A. Phipos, J. A. Simes, and O. C. Goldthwaite, F.E.S.; Secretaries, Messrs. G. A. Lewcock and A. U. Battley. The Pocket-box exhibition was then held. The exhibits which included very many interesting specimens the majority having been taken this season, were as follows:—Mr. Bryant (on behalf of Mr. Marsden), a box of insects from Alexandria, including *Deiopeia pulchella* and species of Coleoptera. Mr. Bellamy, Foreign Lepidoptera. Mr. Clark, long, and very variable series of *Smerinthus tiliæ*, *S. populi*, *Sphinx ligustri*, *Abraxas grossulariata*, fine varieties of *Vanessa io*, *Chelonia caja*, *Liparis monacha*, *Anisopteryx æscularia*, *Polyommatus phlæas* with black hind wings, *Zygæna filipendulæ* with light brick red spots, a white banded form of *Notodonta dodonæa.* Also (on behalf of Mr. Oldham), *Hesperia linea*, *H. lineola*, *Sirex gigas.* Mr. H. A. Hill, *Acronycta strigosa* from Wicken, and a variety of *Chelonia caja* with markings on fore wings of a pinkish colour. Dr. F. J. Buckell, varieties of *Zeuzera æsculi*, showing variation both as to size and markings; varieties of *Melanippe ocellata*, *Cidaria russata*, a dark *Hydræcia micacea*, and five specimens of *Selenia lunaria* (bred from pupæ obtained from Nottingham), some of which appeared to be intermediate, in colour between *S. lunaria* and *S. illustraria*, and a male specimen with normal coloration of the female. Mr. Hodges, two specimens of *Caradrina ambigua* from Isle of Wight, and one from Guernsey; bred specimens of *Dianthœcia echii*, *Epunda lichenea.* Mr. Boden, *Lobesia servillana*, *Coccyx pygmæana*, *Eupœcilia subroseana*, *E. curvistrigana*, *E. notulana*, *E. anthemidana*, and other Tortrices; also varieties of *Lycæna corydon*, and *Argynnis euphrosyne.* Mr. Cooper, five specimens of *Deilephila galii*, bred from larvæ taken near Aldburgh in 1888. Mr. Mera, a dark banded form of *Argynnis euphrosyne*, varieties of *Chelonia caja*, and *C. villica.* Mr. Levett, long and variable series of *Smerinthus tiliæ.* and *Boarmia repandata.* Mr. Battley, a collection of *Rhopalocera*, Mr. Tutt, two cabinet drawers of the *Boarmidæ*, including long series of *Tephrosia crepuscularia*, *T. biundularia*, *Boarmia roboraria.* Mr. Turner, varieties of *Boarmia rhomboidaria*, *Hadena protea*, *Strenia clathrata*, *Melanippe fluctuata*, *Endotricha flammealis.* Mr. Gurney, *Geometra smaragdaria*, *Nyssia hispidaria*, and *Numeria pulveraria.* Dr. Sequeira, a box of Lepidoptera from the New Forest. Mr. Bayne varieties of *Hepialus lupulinus*, including one creamy-white specimen, a variety of *Thera variata*, *Epione advenaria.* Mr. Gates, confluent forms of *Zygæna filipendulæ*, also *Thecla betulæ*, *Lycæna agestis* var. *artaxerxes*, *Hesperia actæon.* Mr. Manley, varieties of *Sphinx ligustri*, *Chelonia caja*, *Abraxas grossulariata*, *Ypsipetes elutata.* Mr. Goldthwaite some splendid varieties of *Abraxas grossulariata*, *Angerona prunaria*, and many other Geometræ. Mr. Lusby, *Sesia myopæformis*, *Chelonia villica*, and a pink variety of *Zygæna filipendulæ.* Mr. C. B. Smith, *Acherontia atropos*, *Ennomos autumnaria*, *Bombyx rubi.* Mr. Conquest a series of *Ennychia octomaculalis*, including a fine variety, and a series of *Bankia argentula.* Mr. Williams, a series of *Chærocampa porcellus.* Mr. Raine, a large number of preserved larvæ, also a pink variety of *Smerinthus populi.* Mr. Milton, *Apatura iris*, *Thecla W. album*, *Lasiocampa quercifolia*, *Arctia fuliginosa*, *Sesia bembeciformis*, *Diphthera orion.*

Hydrous caraboides. Prionus coriarius, Hydrophilus piceus, and other Coleoptera; *Gryllotalpa vulgaris* (mole cricket), *Ranatra linearis, Ledra aurita, Centrotus cornutus, Sirex gigas*. Mr. Elliman, variety of *Liparis auriflua, Triphæna janthina, T. interjecta, Luperina cespitis, Cosmia affinis*, and the following Coleoptera:—*Quedius lateralis, Lycoperdina bovistæ, Otiorrhynchus tenebricosus, Donacia bidens, Philonthus splendens, Ilybius fenestratus*, all taken near Tring in 1890. Mr. Lewcock, a collection of CIRCULIONIDÆ, showing nearly the whole of the genera comprised in this division of Coleoptera. Mr. Heasler also exhibited Coleoptera, including *Oxypoda spectabilis, Deleaster dichrous, Philonthus splendens, P. sanguinolentus, P. decorus*, and six species of *Ocypus*, mostly taken in 1890, in the London district. Mr. Cripps, *Gramoptera præusta, Strangalia melanura, S. armata, Liophlœus nubilus, Molytes coronatus*, and other Coleoptera from Brockenhurst and Chattenden.

Thursday, 4th December, 1890.—The gentlemen nominated as officers at the last meeting were formally elected. From the Secretaries' report for 1890, it appeared that there had been a steady increase in the attendances, the papers had been especially interesting, and the exhibits both varied and numerous. The Secretaries appealed to every member to do their utmost in the coming year to carry the success of the Society still further; by attending as regularly as possible, bringing exhibits, reading papers, by introducing friends to the meetings and thus increasing the number of members. The President, in addressing the members, referred to the difficulty which uninitiated people experience in understanding the interest that a naturalist evinces in the lower forms of life, and drew attention to a few of the advantages to be derived from the study of Natural History. It could be pursued in almost every situation and at all times; it was not necessary to become a scientist in order to study the habits and modes of life of the creatures living about us, and he recommended every member during the ensuing year to note facts relating to injurious insects, in order that some knowledge of the laws governing them might be definitely ascertained. He also remarked on the beauty and order in the multiplicity of forms with which the naturalist has to deal. Mr. Heasler drew the attention of Coleopterists to the Society's collection of Coleoptera, and stated that the number of representative species contained therein was comparatively small; he asked those who studied this order of insects, to endeavour to make this collection of more practical value. Mr. Tutt suggested that lists should be made of the collection of Lepidoptera and Coleoptera, when it would be an easier matter for members to supply those species that were wanted. He also offered to publish a list of the desiderata in the *Record* and to ask the co-operation of non-members towards filling up the existing blanks in the cabinet. The following were the exhibits:—*Triphæna orbona* from various localities, also specimen of a locust from near Gibraltar, by Dr. Buckell. *Cerastis vaccinii* and var. *polita, C. spadicea, Miselia oxyacanthæ* and var. *capucina* and other autumnal species, taken this season, by Mr. Battley. Mr. Hodges (on behalf of Mr. Mutch) exhibited a specimen of *Gonepteryx cleopatra*, stated to have been taken in August, 1882, at Fotheringham, Forfarshire. Mr. Tutt made some remarks on the claims of this species being distinct from *G. rhamni*, and the probable cause of introduction. Mr. Milton, *Erebia blandina*, *Melitea artemis*, *Noctua festiva* and *Agrotis corticea*. Mr. Burrows, *Nyssia hispidaria* from Coventry, also *Phratora cavifrons* and other Coleoptera. Mr. Simes, *Noctua festiva* from Scotland. Mr. Heasler, *Dermestes vulpinus*, *D. undulatus*, etc. Mr. Elliman, *Dromius* 4-*maculatus*, *Mycetophagus* 4-*maculatus*, *Endomychus coccineus*, *Rhinossimus ruficollis*, *R. planirostris*, etc., all taken under the bark of beech trees. Mr. Clark announced that he had recently bred 11 specimens of *Triphæna subsequa* from the ova, also a variety of *Aplecta occulta*.—G. A. LEWCOCK and A. U. BATTLEY, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON.—*December* 3, 1890.—The Rt. Hon. Lord Walsingham, M.A., F.R.S., President, in the chair. Dr. D. Sharp exhibited specimens of *Papilio polites*, *P. erithonius*, and *Euplæa asela*, received from Mr. J. J. Lister, who had caught them on board ship when near Colombo, in November, 1888. Dr. Sharp read a letter from Mr. Lister, in which it was stated that from the ship hundreds of these butterflies were seen flying out to sea against a slight breeze. Many of them, apparently exhausted by a long flight, alighted on the deck of the ship, and large numbers perished in the sea. Lord Walsingham exhibited a coloured drawing of a variety of *Acherontia atropos*, which had been sent to him by Mons. Henri de la Cuisine, of Dijon. He also exhibited specimens of an entomogenous fungus, apparently belonging to the genus *Torrubia*, growing on pupæ, received from Sir Charles Forbes, and which had been collected in Mexico by Mr. H. B. James. Mr. M'Lachlan expressed an opinion, in which Mr. C. O. Waterhouse and Mr. G. C. Champion concurred, that the pupæ were those of a species of *Cicada*. Mr. F. D. Godman said that at the meeting of the Society on the 3rd October, 1888, he had exhibited a larva of a *Cicada* with a similar fungoid growth. The specimen was subsequently produced, and the fungus proved to be identical with that on the pupæ shown by Lord Walsingham. Mr. R. Adkin exhibited male specimens of *Spilosoma mendica*, Clk., bred from ova obtained from a female of the Irish form which had been impregnated by a male of the English form. These specimens were of a dusky white colour, and were intermediate between the English and Irish forms. Mr. F. Merrifield showed samples of a material known as "cork-carpet," and explained its advantages as a lining for cabinets and store-boxes. Dr. Sharp fully endorsed the opinion expressed by Mr. Merrifield. Mr. R. W. Lloyd exhibited specimens of *Anistoma Triepkei*, Schmidt, and *Megacronus inclinans*, Er., collected last August at Loch Alvie by Aviemore. Mr. Merrifield read a paper entitled, "On the conspicuous changes in the markings and colouring of Lepidoptera caused by subjecting the pupæ to different temperature conditions," in which it was stated that the results of many experiments made on *Selenia illustraria* and *Ennomos autumnaria* tended to prove that both the markings and colouring of the moth were materially affected by the temperature to which the pupa was exposed: the markings by long continued exposure before the last active changes; the colouring, chiefly by exposure during these last changes, but before the colouring of the perfect insect began to be visible, and moderately low temperature during this period causing darkness, a high one producing the opposite effect, and two or three days at the right time appearing in some cases sufficient. Dryness or moisture applied during the whole pupal period had little or no effect on either markings or colouring. Applying the facts thus ascertained, Mr. Merrifield said he had obtained from summer pupæ of *illustraria* some moths with summer colouring and spring markings, some with spring markings and spring colouring, and some with summer markings, but an approach to spring colouring. These specimens, with enlarged and coloured photographs of them, were exhibited. Mr. C. Fenn, who said he did not agree with Mr. Merrifield's conclusions, exhibited a very long and varied series of specimens of *Ennomos autumnaria*, all of which, he stated, had been bred at the same temperature. He expressed an opinion that the presence or absence of moisture, rather than differences of temperature, was one of the principal causes of variation. The discussion was continued by Lord Walsingham, Colonel Swinhoe, Mr. Waterhouse, Mr. Jenner Weir, Captain Elwes, Mr. M'Lachlan, Mr. Porritt, Dr. Mason, Mr. Barrett, and others. Mr. G. T. Baker read a paper entitled "Notes on the Lepidoptera collected in Madeira by the late T. Vernon Wollaston." The paper was illustrated by a number of figures drawn and coloured some years ago by Prof. Westwood. Mr. Hamilton H. Druce exhibited several very beautiful species of butterflies, belonging to the genus *Hypochrysops* from the Solomon Islands and Australia, and read a paper on the subject, entitled "A Monograph of the Lycænoid genus *Hypochrysops*, with descriptions of new species." Mr. C. J. Gahan read "Notes on some species of *Diabrotica*."—H. Goss and W. W. FOWLER, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*Nov.* 13*th*, 1890.—Mr. Wellman exhibited *Bryophila impar* from Cambridge, and a specimen of *B. glandifera*, very similar to *impar*, from Folkestone. Mr. Tugwell, a long series of *Cerastis vaccinii* and of *C. spadicea.* Mr. R. Adkin, specimens of *Spilosoma mendica*, bred from ova obtained by pairing a ♀ of the Irish form with a ♂ of the English form. As a result of the brood, only two moths (♂'s) were obtained, which were dissimilar to both the ordinary Irish and English forms. He also exhibited *Peronea sponsana* from the New Forest, and referred to the fact that out of some twenty specimens obtained only four or five were of the variety. Mr. Cockerell exhibited Diptera and Hymenoptera, showing parallel variation in colour,—the first series passing from green to blue, the second from yellow to red.

Nov. 27*th.*—Mr. South exhibited an interesting and varied series of *Melanippe fluctuata* from Ireland, London, and Scotland; Mr. Adkin, a fine series of *Arctia menthastri* from North Ireland, of an ochreous ground colour, and varying much in the spotting; Mr. A. J. Hodges exhibited a specimen of *Leucania vitellina* captured this autumn in the Isle of Wight, and specimens of *Caradrina ambigua* from the Isle of Wight and Guernsey; Mr. Adye, two forms (dark grey and red) of *Anchocelis lunosa*, whilst Mr. Tugwell exhibited a most interesting series of magnificent forms of *Triphæna orbona* from various localities (chiefly Scotch), and *T. subsequa*, mostly from Forres; Mr. Short exhibited the two broods of *Lobophora viretata*, which vary in size, and *Arctia fuliginosa*, large and well-marked, from Aberdeen.—ED.

The Entomologist's Record
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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 228.)

PLATE V. shows the larvæ of the sub-genus *Viminia* in their first skins, as well as the larva of *Bisulcia* and that of *aceris* also, so placed for convenience in filling the Plate.

All these larvæ show the characteristic feature of *Acronycta* at this stage, viz., the pale and "weak" 11th segment, so curious, and, so far as I know, so exclusive a character, that it renders this stage one of much importance, in the consideration of the classification of the genus, both of the species among themselves, and in their relations to other families. It proves abundantly, if the form and sculpturing of the egg and other characters did not do so, that the genus is a natural group of closely related species, and that the remarkable variety in the appearance of the full-grown larvæ, though it may illustrate the tendency of varieties of a species to imitate the other species of a genus, and of the species of a genus to imitate allied families, affords no ground for breaking up the genus and distributing it among those families, as was proposed by Mr. Butler in his paper, already alluded to. A short study of either the *ova*, the newly hatched *larvæ* or of the *pupæ* of *Acronycta*, shows the conclusions at which Mr. Butler arrives, to be so chimerical, that a further discussion of them would hardly be profitable, though, as illustrating the superficial nature of the resemblances that form the inspiration of his paper, I may be excused for quoting a characteristic paragraph :—"*A. a ni* appears to be referable to the *Noctuites*, the caterpillar much resembling, both in colour and in its clavate hairs, the larva of *Tinolius*, the latter, however, is a semilooper and therefore *not* nearly related to it." (The italics are mine.) One would suppose not much nearer than *Pieris brassicæ* is to *Eubolia cervinata*, though the young larvæ of both these have their hairs tipped with moisture. One is, indeed, astonished that so accomplished a systematist as Mr. Butler, should found such startling conclusions on mere superficial resemblances of full-grown larvæ, whilst his careful examination of the neuration in *Acronycta* and certain other genera, instead of confirming his conclusions, clearly shows them to be untenable. He finds a uniform type of neuration in *Acronycta*, and some little differences, little, but of importance, for the neuration differs only in small particulars, amongst a large number of more or less allied families, between *Acronycta* and each of the several groups amongst which he proposes to distribute them.

To return to our *Viminia* larvæ. As I have stated under each species, the larvæ, when newly hatched are pale, but in a short time, often only a few minutes, become black, the tubercles being set so closely together as to show nothing but the black tubercles, and it is necessary they should grow a little before their real features can be fully, or at least at all easily seen. It results that the figures are drawn at different ages of the several larvæ and at different degrees of enlargement. Throughout the whole genus, the 11th segment is pale (and "weak") and in *Viminia* 3. 4, 6. 7, 10 and 13 are also pale, the other segments being darker. There is a tendency in all of them to develop a white ring round each tubercle, most marked on the pale segments, and in the Plate is best seen in fig. 4, *menyanthidis*, and 7, *rumicis*. In *menyanthidis*, this proceeds to the fullest development, giving to the pale segments a porcelain-like density and solidity, the pale portions of the other species always having a somewhat delicate transparent character. The echinate character of the anterior trapezoidal tubercles, each hair starting from a pyramidal base and the whole tubercle forming a slight dorsal boss, is not brought out in any of the figures, it is just hinted at in fig. 2, *auricoma*. This character is most marked in *rumicis* and *venosa*, least so in *menyanthidis*.

It remains the case, however, that, notwithstanding the great peculiarities which distinguish these young larvæ from all others, the five species present only slight characters, chiefly in the development and intensity of the pale rings round the tubercles, to distinguish them from each other, so very much alike are they. I should not like to pronounce on the identity of any of them presented to me at random, though I can detect certain slight differences when I have them side by side for comparison.

They all agree in having several hairs on the anterior trapezoidal tubercles and only one on each of the others. On the trapezoidals (anterior) they all tend to have fewer hairs on the 3rd and 4th segments (if dorsal tubercles here are really anterior trapezoidals) and more on 5th, 9th, and 12th. On the remaining segments 6. 7. 8. 10 and 11, *venosa* has three hairs on the anterior trapezoidal tubercles, *rumicis* has three strong hairs and two faint ones, *menyanthidis* has five, *myricæ* six, and *auricoma* seven. So that here we have a decided means of distinguishing them, but by no means so simple in application as the plain statement of the numbers suggests, a correct enumeration being indeed very difficult unless the larva is chloroformed, or, in effect, in some other way killed.

Figures 8 and 9 are the larvæ of *Bisulcia ligustri* in their first skins. This larva is a true *Acronycta*, the 11th segment being pale and "weak," the paleness is here no especial feature, as none of the segments are dark, but the "weakness" and form are distinctive, it is smaller than the others, chiefly by being lower dorsally, and weaker by the much smaller tubercles. It also presents the tendency to a lateral projection, well shown in fig. 8, which is always most pronounced in the larva when newly hatched, and is therefore best seen in the figures of larvæ of *Viminia* that are taken from the youngest larvæ, viz., fig. 1, *auricoma*, fig. 6, *venosa*. In this larva each tubercle, anterior trapezoidal as well as the rest, has only one hair.

Fig. 10, *aceris*, had space permitted, ought to have been in Plate VI. with the other *Cuspidia* larvæ. This figure is from a larva almost newly hatched; it shows well the characteristic *Acronycta* form of the 11th segment as regards having a lateral expansion. The pale segments here are 6. 10 and 11.

(*To be continued.*)

SCIENTIFIC NOTES.

VARIATION ASSOCIATED WITH CHANGE OF CONSTITUTION (DISEASE?) IN ACRONYCTA ALNI.—I have bred *A. alni* for several years, have always found it rather shy as to breeding, and, each year, have observed several instances of useless pairing. But this year (1890), though many pairings occurred, none settled down in the normal manner, and no fertile eggs were laid. I have called this the result of a change of constitution, not necessarily disease, partly because precisely the same procedure has always occurred in my hands with *strigosa*, and this, with moths from captured larvæ. The curious point, however, in the case of *alni* is, that in previous years, hardly a specimen departed, even in a slight degree, from the normal type, whilst this year, about a third of the specimens differ, more or less, either in suffusion of the pale areas with darker scales, or in variation in the stigmata, generally in the direction of disappearance of the orbicular one. The variation and the failure to breed may be fortuitous coincidences, or there may be a causal connection between them. That the latter is the case is probable, from the record of other instances of a similar character. I am able to add another to these in the case of *Arctia caia*. I had some eggs sent me from a race that was producing *vars*. These eggs were smaller than eggs laid by a normal female, in the proportion of about 7 to 8 in diameter, and, though supposed to be fertilised, not one of them hatched; and my correspondent informs me that the result of his procedure is to secure a number of varieties, but to lose the race in the third or fourth generation.—T. A. CHAPMAN, Hereford. *December*, 1890.

HOLES IN WINGS OF LEPIDOPTERA.—I believe that holes in the wings are always the result of injury to the pupa, just after casting the larva skin. I remember, on one occasion, observing this moult, and noting a particle of sawdust falling on the larva, where the wings afterwards covered it in, and that the resulting moth had a hole in the wing at this point. As I record this from memory, after a lapse of some thirty years, it is possible that I have made the observation a more distinct one than it was in reality, but I know positively that from some such observation, I have ever since regarded holes, especially in the under wings, as due to injury from particles of dirt getting between the wings and the larval body at this critical period.—T. A. CHAPMAN, Hereford.

PUPÆ IN A COMMON COCOON.—While rearing some larvæ of *Bombyx neustria* two years ago, I noticed two of the larvæ spun a common cocoon. The forthcoming moths were in no way malformed; their sexes I forget.—R. M. PRIDEAUX, Vyvyan Terrace, Clifton, Bristol. *December* 27*th*, 1890.

TEMPERATURE AND VARIATION.—In the observations made in the last number of the *Entomologist's Record*, on my published experiments designed to ascertain the causes of darkness of colouring in some lepidoptera, I think you have given me credit for views of wider application than any that I am conscious of having given expression to. I am too conscious of my want of a sufficiency of exact knowledge on the subject, to have attached myself to any exclusive theory as to these causes. The variations in the colouring of lepidoptera are often associated with particular climates, seasons and habits, and it seems to me more than probable that there are several quite different causes for such variations; protective requirements and hereditary tendencies being among them. But I think there can be no doubt that temperature is one cause. I laid before the Entomological Society on the 3rd inst., some facts which not only confirm in every way the view previously indicated, that exposing the pupa to a low *or moderate* temperature, as contrasted with a high one, is in some species a principal cause of darkness of colouring in the perfect insect, but go far to localise the period of the pupal stage at which the temperature so operates, and to show that changes in markings and in colouring, are respectively due to different applications of temperature. As to moisture, I am by no means prepared to say that it is not one of the causes, though some experiments, specially directed to this point last summer, tend to show that moisture has little or no appreciable effect on the colouring of the species operated on—*autumnaria* and *illustraria.* The remark you quote from a letter to the effect that the governing consideration is—which brood am I to belong to—and as to "converting one form into the other," was made with reference to double-brooded species, in which each of the seasonal forms habitually carries with it special qualities of size, markings, colouring, etc. Here the question which of the two forms the moth shall belong to—and thus, indirectly, what shall be its colouring—would usually be determined before the end of the larval stage. Experiments made last summer have shown, however, that even in these cases the markings and colouring may be greatly affected by the temperature to which the individual pupa is exposed.—F. MERRIFIELD, 24, Vernon Terrace, Brighton. *December*, 1890. [It is with the greatest pleasure that I print Mr. Merrifield's opinion of my criticism of his paper, and the inferences I drew from it, and feel satisfied, that much as I differ from him as to the cause which produced the effects noted, that only a careful consideration of all possible views of the question can lead us to even a moderately correct solution of this matter.—ED.]

FECUNDATION BEFORE HYBERNATION.—I have frequently captured *Vanessa urticæ* in copulâ after hybernation, but never before; in fact, the sexes appear to have very little attraction for each other before hybernation.—WM. NEWMAN, 21, Russell Street, Darlington.

I see by this month's *Record*, that you ask for any notes on the pairing of insects before hybernation. I once took *Colias hyale* in copulâ in August, and I believe that species hybernates in the perfect state.—A. W. MERA, Forest Gate. *December*, 1890. [I doubt whether this species normally hybernates in the imago state although instances are on record of its doing so.—ED.]

CAUSE OF ANEURISM.—Aneurism of the wings is, I fancy, entirely an artificial condition, and is caused by the insect failing to maintain its foothold, when the wings are partially expanded; in the fall, the larger nervures or wing-rays are bruised or bent, and this causes the expanding liquid to be dammed up at the points of injury, thus causing the apparent aneurism.—C. FENN, Lee. *November*, 1890.

I do not agree altogether with my friend Mr. Fenn as to the cause of aneurism, although a somewhat similar appearance might be produced from the injury noted. I believe the mechanism of development of the wings is as follows:—(1). A gradual unrolling of the hollow spiral nervures by the propulsion of air along them, the nervures being simply extended tracheal passages (the movement of the insect at the time will explain this). (2). The upper and lower membranes are stretched out, as the wing-rays or nervures unfold, until they have attained their utmost development. (3). A fluid passes equally between the upper and lower membranes as they are rolled out, to prevent friction. (4). The rapid and equal evaporation, from the surface of the wing, of the fluid when it has done its work. The so-called aneurism appears to be, rather a collection of superfluous fluid in the terminal cells of the wing, than to have any real connection with the nervures. Of course, injury, by which the fluid would be artificially stopped in its course, would produce a somewhat similar appearance.—J. W. TUTT. *December*, 1890.

THE DIFFERENTIATION OF CIDARIA RUSSATA (TRUNCATA) AND IMMANATA.—I am quite unable, after examining some hundreds of these species, to find any distinctive character in the upper wing markings, but I am not aware that an attempt has been made to distinguish *C. truncata* from *C. immanata* by the markings of the lower wings. With regard to the six specimens enclosed:[1]—No. 1 with the black median band is from Devonshire, and was common in August, 1889. Nos. 2 and 3 are from the Island of Lewis (Scotland); these three I call *C. immanata*, distinguishing them by the angular line of the under wing. No. 4 is from the same locality as No. 1, and Nos. 5 and 6 are from Lewis (the same as Nos. 2 and 3); these three I call *truncata*, and distinguish them by the rounder waved line of the under wings. In forms 1, 2, and 3 the angle is decidedly an acute angle, while in 4, 5, and 6 it forms an obtuse angle. In the latter cases, the upper part of the line is toothed, which is not the case with *immanata*. This year, I am breeding from both forms, but, at the same time, I invite criticism on the opinions above expressed.—H. TUNALEY, Erdington Hall, Birmingham. *April 25th*, 1890.

I scarcely like to offer an opinion on Mr. Tunaley's *Cidariæ*. *C. russata* taken here, shows either no line, or only the faintest possible trace of one on the upper side of the secondary wings, though generally distinct on the under side; and on looking through mine, I must say, the angle appears to be more obtuse in nearly every instance, still they are not like Mr. Tunaley's, and with perhaps the exception of No. 4, I should take his specimens to be all *immanata*. At what time of the year were they taken? *Russata* is double-brooded, and appears here in May and September, whilst *immanata* is single-brooded, occurring only in July.—P. RUSS, Culleenamore, Sligo. *May 21st*, 1890.

The larvæ of *Cidaria immanata* and *russata* were differentiated by the Rev. J. Hellins, in the *Ent. Mo. Mag.*, vol. i., p. 165. I do not know the larva of *immanata* myself, for although I have tried many batches of eggs, I could never get any to hatch; they have always dried up in the winter. *Russata* I have reared from eggs over and over again. In Yorkshire, the two species are distinct enough in the imago state, and *russata*, in my experience, very rarely runs to those *immanata*-like forms you so often get in the south. In my series of 44 *russata* and 45 *immanata*, where the line on the hind wing shows at all, it is acute-angled in *immanata*, and obtuse-angled in *russata*, excepting perhaps in one specimen of *immanata* (not from the West Riding), where the line is neither acute nor very obtuse but between the two. In many of my slate coloured Yorkshire specimens though there is no trace of a line in the hind wings at all.—G. T. PORRITT, Huddersfield. *June 6th*, 1890.

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[1] Exhibition Box, No. 7 basket.—ED.

Mr. Tutt's remarks[1] on the above species have led me to refer to my diary. I find that I have noted captures of what I have believed to be *truncata*, in several localities round London and in Hampshire, between May 26th and June 27th, and again in the last week of September. My dates, for the insect I have supposed to be *immanata*, range from July 24th to August 24th. I have put a specimen in the Exhibition box.[2] The only locality in which I have met with this insect is in that part of Epping Forest between Chingford and High Beech. In *truncata* the markings seem to me much less sharply defined than in *immanata*.—F. J. BUCKELL, Canonbury Square, N. *April*, 1890.

C. russata occurs at Portland plentifully; last season (1889) I took it from May 25th to June 18th, and again at the end of August to September 14th. It varies greatly, but the markings are dark and not sharply defined. I was at Brockenhurst from August 12th to 20th, 1889, and then took 16 specimens of what I believe to be *immanata* off ragwort flowers. I had not seen the insect before. I saw several more at the same time, but as most of them were worn, did not take them. In addition to the difference, as described by Dr. Buckell, in the few specimens I have, *immanata* has a sienna brown bar near the base of the wing which is sharply angled near the costa. In *russata*, this bar is not angled, and is dark coloured, with hardly a trace (and that in only a few instances) of the sienna. Perhaps, however, this distinction does not hold in a long series.—E. W. BROWN, The Verne, Portland. *April*, 1890.

We take *russata* and *immanata* here (I believe they form, however, but one species) from June to September. I have had *russata* sent me from very many localities, and also a number of *immanata* from English friends, but as yet I have never been able to distinguish the one from the other. Besides, I have sent our examples to numbers of our best lepidopterists, and they have always been willing to accept them under whichever name I sent them. The late Mr. Newman reared a number of imagines from the eggs of one ♀, and when he sent the whole of them to Mr. Doubleday, the latter gentleman said he thought both species were included in the consignment, but could not make out which were one species and which the other. I also have captured the species at ragwort; I have seem them flying literally in thousands among the flowers. I never attempt to select them, but catch as rapidly as possible, putting several into one large chip-box. Of course some will be spoiled, but if killed as soon as possible after, the number will be reduced to a minimum.—W. REID, Pitcaple, Aberdeen, N.B. *April*, 1890.

During the early summer months, I take what I consider to be *russata* in great variety. In the autumn, I take dark varieties, which I had labelled in my collection as *immanata*, until Mr. Tutt suggested that they were the second brood of *russata*. I have received series of *immanata* (so-called) from correspondents, but whether they are really that species I cannot say, as some vars. of *russata* I have taken, resemble them so strongly, that I am certain I could not separate them if mixed up. It is, however, worthy of remark, that I have never met with the lighter forms of *russata* during autumn, although the darker ones seem pretty numerous, flying in a wood, close to the ground over low flowers.—Hope Alderson. *June*, 1890.

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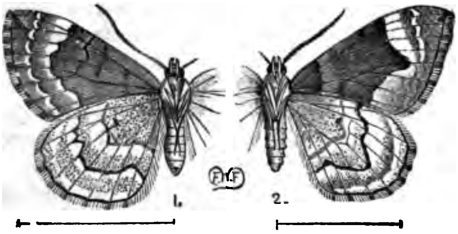
[1] These were in the form of a note in one of the Exchange books in which I stated that *russata* (*truncata*) was double-brooded (June and September), *immanata* single-brooded (July to September).—ED.

[2] This is apparently *immanata*.—ED.



I have been repeatedly asked, during the season, for some good character by which to distinguish these two species, and, although I was well aware that there is not the slightest doubt of their specific distinctness, I failed to satisfy any one, and was decidedly bothered, when I tried to pick out *immanata* from *russata* among those in my possession. I have some hundreds of both species, and, after an hour or two's study of the question, I think I can point to a character which will readily separate them. I recollect, in 1884, calling on Mr. Sydney Webb; and, in the course of looking through his unrivalled collection of varieties, the question of a character to separate the two was discussed, when he pointed out to me what appeared to him to be a very satisfactory one, viz., that in *immanata*, the edge of the dark band near the apex of the wing runs from the costa in a bold curve before forming the two teeth generally common to both, while in *russata*, it slopes gradually downwards as a more or less serrated line. This is a fair character and will be useful in many cases, but, unfortunately, it is not constant. I have undoubted *russata* with the *immanata* character in the band and *vice versa*, so I was reluctantly compelled to give this up and seek further for something more decisive. I was decidedly at fault at first, for anything is sent out from the northern counties and from Scotland as *immanata*, but, luckily, I had about a hundred *russata* bred by myself, and some undoubted bred *immanata*, so at any rate I was sure of some trustworthy material to work on. I find, on examination of these specimens, that on the underside of the under wing is a more or less conspicuous band or line, and that this band is constant in its variations in the two species. Starting from the costa, about two-thirds of the distance from the base, it proceeds downwards in a series of curves or zigzags from nervure to nervure; these are most pronounced in *russata* (fig. 1). Reaching the first branch of the median nervure the band is bent in *immanata* (fig. 2) almost at a right angle, and is continued nearly parallel to the edge of the wing, until it reaches the hind margin, but, immediately before this, it makes a sharp curve downwards. The band in *russata* is not angled in the same way, but proceeds from the median nervure in a bold curve, till it ends at the inner margin similarly to *immanata.* The band is often indistinct, sometimes obsolete, on the upper surface of the wing, but it is very distinct in nearly every case on the underside. There is a dark shade which follows the course of the band in most cases, and takes the same direction. The specimens which show the true character of *immanata* best, are those from Shetland, and, as the venation is often darker, it is very valuable when studying the structure of the wing. I have *russata* from many different counties in England, including most of the northern ones, also in Scotland, from Perth, Aberdeen, etc. I think there can be little doubt that *russata* is more abundant than *immanata* in the south, while the reverse is the case in the north, and, as the second brood of *russata* appears at the same time as the only appearance of *immanata*, there is little to be wondered at in the confusion that has arisen. Certain vars., however, are peculiar to each. The var. *centum-notata*, the *russata* form with brown, orange or chocolate ground colour, according, as a rule, to the condition of the insect, never appears in *immanata*; while the latter has, in most cases, a distinct paler, and often brownish or purplish band near the base of the fore wing, of which there are generally but slight indications in *russata*. *Russata* is a bigger, coarser insect; particularly the spring brood. Any characters, drawn from the size or prominence of the teeth in the submarginal band of the fore wing, are worse than delusive. With regard to the natural history of the two species, it may be as well to say a word or two, for many of our collectors still entertain a lingering idea that they are identical. This is not, however, the case. The eggs of *russata*, laid in the autumn, hatch within a short period, the larvæ hibernating and producing the spring brood in May (end) and, June. The offspring of these become the autumn brood, which emerges in August, September, and even the beginning of October; *immanata*, on the other hand, is single-brooded. The eggs, laid in autumn, pass the winter in that state, and the larvæ hatch in March and April, the moths appearing from the end of July to the beginning of September. It has been suggested, that *russata* and *immanata* are climatic varieties, but this is incorrect, for they occur together, and, surely the surroundings of the one would hardly fail to affect the other. One more word and I have done. The eggs are distinct in colour, *russata* being a pale whitish ochreous, and they do not seem to materially change colour before hatching. *Immanata* ova are yellowish almost reddish, and darken very considerably before they hatch.

The young larvæ of *russata* are whitish, while those of *immanata* are yellow, and when full-fed they differ considerably in several important points, but, as these would prolong this paper to too great a length, I must refer to the late Rev. J. Hellins' masterly description of both species in the *Ent. Mo. Mag.*, vol. i., p. 166, which I have personally verified by breeding both insects.—C. FENN, Eversden House, Burnt Ash Hill, Lee, Kent. *21st October*, 1890.

Mr. Fenn remarks that *Cidaria immanata* appears in August and September. I remember once taking several specimens, just emerged, at Folkestone the second week in July. I have not had much experience with this species, but is it not a fact that this insect appears between the first and second broods of *C. russata*, at least, that the former would be getting worn before the second brood of the latter appeared? On comparing the *C. russata* taken at Abbott's Wood with *C. immanata* from Folkestone and Arran, I notice that the former seem much larger, my observation thus coinciding with that of Mr. Fenn on this point.—E. C. DOBRÉE FOX, Castle Moreton.—*Nov.* 1890.

I see that the *Cidaria russata* and *C. immanata* discussion has been re-opened, and I am very much interested in Mr. Fenn's paper. But, after all that has been said, I am very much in the same position as before. In one of my former notes I had already answered Mr. Fenn's question, but I may repeat again, what I have said before, that the *Cidaria* we get here from June to October, both inclusive, is nothing more or less than one and the same species, namely, *immanata*. Here, the species commences to come out about the third week in June, and increases in abundance until August or the beginning of September, when it is at its maximum, it then gradually decreases in numbers until October, when it disappears. Ova from the June ones produce larvæ, which come out in September, augmenting the brood which lie over until August or September; and further, this second brood copulate freely with the others, and *all* lie over the winter as ova. Var. *comma-notata* is very scarce here, but I have taken the var. several times. I do not doubt but that the var. (?) known as *russata*, is regularly double-brooded in England; but, whether the insect, appearing intermediate between the two broods, and, I understand, merging into both of them, is distinct from *russata*, is another matter. I am open to conviction, and I shall be extremely glad if Mr. Fenn can give us some reliable distinction, whereby we may know how to separate the two species; but, as yet, my own conviction is, that there is only one species, viz. *immanata*, and that *russata* is only a highly specialised form of *Cidaria immanata*. In my opinion, its being double-brooded counts for nothing. Insects are double-brooded in one part of the country, and single-brooded in another; double-brooded one season, and not in another, or only partially so. And, is it not quite possible that one form of an insect could be double-brooded, while another is single-brooded, even in the same locality? If Mr. Fenn, or any other entomologist, can point out a structural difference between the two, so-called, species, then, and not till then, can anyone call them two distinct species. It is right that I should say here, however, that my references to the June and July *immanata* depositing ova, which appear, as perfect insects, in September, is in a state of confinement. I have no idea if they do so in nature, but I know that quite young larvæ are obtained in the beginning of August. I see Mr. Fenn and I agree in thinking that only one species is got in the north. And it is quite possible that all the southern (English) ones, I have seen, are *immanata;* but this is hardly likely, as the *russata* form appears to be most common near London. I, like Miss Kimber, would be much obliged to Mr. Fenn, if he would kindly send round one or two true *russata* in the Exhibition Box, even though not in very good condition. Had there been room I would have sent round a few from my series, with dates affixed.—W. REID, Pitcaple, Aberdeen. *Nov. 25th*, 1890.

THE GENUS DONACIA, Fab.[1]—The beetles contained in this genus comprise some of the handsomest examples to be found in the Coleopterous fauna of the British Isles. The name given to them is derived from the Greek word *donax*, which signifies a reed; and the term is exceedingly applicable to this class of phytophagic beetles, as it implies that they are chiefly to be found among reeds, sedges, and such like aquatic plants. About ninety species of the group are known, thirty of which are found in Europe, and nineteen of the number inhabit this country. The larvæ of the beetles feed in the stems of their foodplant, and are seldom or never seen by the ordinary collector. When full-fed, the larvæ spin cocoons at the roots of the plant in order to undergo their next change. Like almost all other insects of this order, the duration of the pupal stage is exceedingly short, but the beetles do not leave their cocoons for some time after having attained the perfect condition, but remain in a state of hybernation until the arrival of the warm sunshine, when they crawl up the stems of the plants, and make their way out of the water. Some species are to be found early in May, others in June, July, August, September, and even as late as October. As previously observed, they are essentially lovers of the bright sunshine, but the month of the roses is certainly the most favourable time for obtaining them, as they prefer the hottest weather wherein to take their sport and pastime. At this period of the year, they may be observed by anyone who cares to seek them, flitting from stem to stem in the reedy places, or skimming over the broad floating leaves of various water plants—the leaves of *Nymphæa alba* and *Potamogeton natans* being their special resort, and it is on the latter plants where I have chiefly found them.

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[1] Abstract of a paper read at the meeting of the City of London Entomological and Natural History Society, on December 18, 1890.

The British species are divided into two major groups by Fowler (*Coleoptera of British Isles*), as follows:—

1. Tibiæ not produced externally into a tooth at apex; apex of mandibles only slightly projecting beyond labrum; first segment of abdomen longer than the rest taken together.
2. Tibiæ produced externally into a tooth at apex; mandibles stout, projecting considerably beyond labrum; first segment of abdomen equal to, or rather shorter than, the remainder taken together.

These groups are again subdivided into smaller ones; but nearly all our species vary so little in their general characters, and minute descriptions are so bewildering, that it is far better for the young student to find some distinct character by which he may know each species. This will not prove a very difficult matter with this genus, except in the case of *D. sericea* and *D. discolor*, which will be duly dealt with in the proper place.

The first species on our list is *D. crassipes*, F. In this species, the posterior femora are very long, reaching to apex of elytra, the insect generally dark in colour, and it has a flat compact-looking appearance. Mostly found on the leaves of *Nymphæa alba*. A few years since, the late Rev. H. J. Gore took a great many at the New Forest, some of which he kindly gave me. Several localities are given by Stephens and Fowler, in England, Scotland, and Ireland; the species seems widely distributed, and other localities may also be found by the ardent explorer.

D. dentata, Hoppe.—Said to be closely allied to *D. crassipes*, but the general build of the insect is very different; it is much more robust in shape, and could hardly be confounded with the latter species. The colour also is much more variable, some being of a brilliant grassy green, and others of indigo-blue. The specimens taken by me at Basingstoke Canal in June, 1887, occurred on *Potamogeton natans*, and by getting into the large patch floating on the water, I captured some fifty or sixty during the afternoon. The best time of day for *Donacia* species is from one o'clock up till seven.

D. versicolorea, Brahm.—Known as *D. bidens*, Ol., in Cox's *Handbook of Coleoptera*, and also in Sharp's first edition of *Catalogue of British Coleoptera* and Fowler and Matthew's *Catalogue* (1883); in second edition of Sharp's *Catalogue* (1883) it is termed *versicolora*, Brahm. The shape of this species is much shorter than either of the preceding, the legs also are much stouter; the colour is uniformly darker, almost black. It is very active in habits, and the best mode of capturing it is to draw the leaves of the plant under water, when the beetles may speedily be picked off and bottled. I have found specimens as early as June, and as late as October. At Basingstoke Canal, in 1887, I took a great quantity. Occurs also at Walthamstow in the various ponds at that locality. The insect is widely distributed, and sometimes common.

D. sparganii, Ahr.—This insect has frequently been confounded with *D. dentata*, and but recently I received two specimens as the latter beetle. The error probably arises from the tabulation in Cox's *Handbook of Coleoptera*, wherein it states that the posterior tibiæ of male are without prominences on inner side, and has thus caused the confusion of the two species. The legs of *D. sparganii* are unicolorous dark, and more or less metallic; while in *dentata* they are red. Moreover, *sparganii* is uniformly dark, and besides a much flatter insect. The only locality known to me is Watford, Hertford, where it is taken by Mr. A. Piffard and Mr. T. Hall.

D. dentipes, F.—Sometimes called *aquatica*, L., but the latter name has not been adopted in Britain, for the simple reason, that it has been applied to so many of the *Donacia* species. The insect is one of the most beautiful of the genus. Elytra of brilliant green, with a broad purple and red stripe running down the entire length near suture. It has been taken commonly by Mr. Piffard; and also by Rev. Theodore Wood at Aylsham, Norfolk, on aquatic plants.—G. A. LEWCOCK. (*To be concluded in our next issue.*)

CURRENT NOTES.

The South London Entomological Society's Report (for 1888 and 1889) is at last in the hands of the printer. It is expected that it will be issued to members during January. Members will without doubt be much interested in reading up the Reports of the Meetings held in 1888.

Our correspondent, Mr. W. Reid, of Pitcaple, has been ordered a great deal of out-door exercise, and has fully determined to devote his whole time this year to collecting Lepidoptera, by subscription, in North-east Scotland. His intimate knowledge of the district, his scientific interest in our work, and above all the personal esteem of his correspondents should secure him thorough support and ensure his success. Mr. Reid *will reserve no* shares for himself, as he wishes to be quite above suspicion in an occupation which we hope will restore him to perfect health. He wishes to limit the subscription to 30 shares at £5 each.

The Rt. Hon. Lord Walsingham will read an address at the Annual Meeting of the Entomological Society on Wednesday, January 21st, at 7 p.m.

Mr. C. G. Barrett has described (in the *Ent. Mo. Mag.*) a new *Anacampsis*, allied to *anthyllidella*, but distinguishable "by its narrower fore-wings and more acute apices." This appears to be the species I took in fair numbers in July, 1889, near Freshwater, and could not, at the time, name. Mr. Barrett names it *sparsiciliella.* Mr. A. F. Griffith, M.A., adds Herrich-Schäffer's *Symmoca signatella* to the British list. Seven specimens were captured near the London Docks in 1889 and 1890. They are supposed to have been introduced with cargoes of Spanish cork. Mr. Nelson M. Richardson also adds the *Tinea subtilella* of Fuchs to the British list. Eight specimens were captured during August at Portland, by Mr. and Mrs. Richardson.

Lord Walsingham, in the *Ent. Mo. Mag.*, writes a most interesting note about certain *Eupœciliæ;* (1). *E. affinitana*, the larvæ feeding in stems of *Aster tripolium;* (2). *E. heydeniana* and *E. anthemidana.* "The species feeding on *Anthemis* seems to be undoubtedly *heydeniana*, H. S." = *anthemidana*, Wilk. The species in our collection as *anthemidana*, feeding in the flowers of *Erigeron acre*, he names *erigerana*, describing both sexes of the imago, and the "small ivory-white larva, with a brownish head, feeding in the flowers of *Erigeron acre.*" This would appear to be the pale triple-brooded species locally common in several parts of Kent.

Mr. N. M. Richardson, also in the *Ent. Mo. Mag.* describes the larva of *Lithocolletis anderidæ.*

VARIATION.

Variation of Ypsipetes elutata.—On the moors, this species is later than elsewhere in its appearance. The bilberry-feeding forms produce nearly every variety of colour, even occasionally black. The moorland sallow-feeders generally produce reddish-buff specimens, and the same (sallow-feeders), in woods where no bilberry is procurable, are as a rule the black variety *infuscata.*—A. E. Hall, Sheffield. *June 26th*, 1890.

I breed examples of this insect, similar to some exhibited by Mr. A. E. Hall in the baskets of the Exchange Club, from bilberry and heath-fed larvæ. Sallow-feeders, even on the moors, are larger, greener and not so variable. Our bilberry-feeding form remains the same, whether fed on sallow, heath or bilberry, and the sallow-feeder will not change colour or size if fed on bilberry or heath. Here, both forms can be got in Pittodrie Wood; but on Ben-na-chie, only the small bilberry form.—Wm. Reid, Pitcaple, N.B. *July 5th*, 1890.

The *Y. elutata* from Carmarthenshire were all taken amongst sallow, and varied very little in size, though very much in colour. The dark and the light forms were found together everywhere, with every intermediate variety. There were of course many other plants in the hedges as well as sallow, but I cannot say whether the *elutata* larvæ fed on them or not.—N. M. RICHARDSON, Weymouth. *June 24th*, 1890.

With regard to *Y. elutata*, I may mention that it occurs here in very great profusion on sallow, and, from these larvæ on sallow, I have bred a number of very large and varied forms, graduating from the palest green with reddish markings to very dark olive green almost unicolorous. Among these ordinary specimens, there occurs sparingly a small dark, almost black form, expanse quite one-third under the normal size. I have always attributed this aberration to starvation, as it occurs most freely when the larvæ have been neglected. In the Sevenoaks district, *elutata* is exceedingly abundant among the *Vaccinium*, but except in being a little smaller, is not distinguishable from the usual southern type from sallow.—C. FENN, Lee, Kent. *July 26th*, 1890.

NOTODONTA DROMEDARIUS var. PERFUSCA.—I have recently found that a fair percentage of our *Notodonta dromedarius* are to be referred to var. *perfusca*, formerly thought to be a species. Newman observes that this form is exclusively Irish.—J. COLLINS, Warrington. [I have all my Warrington, Pitcaple, and Barnsley specimens labelled var. *perfusca*, and it would be interesting to know whether the type occurs in these districts. My Scarborough and Liverpool specimens are practically *perfusca*, but labelled *dromedarulus*, on account of their smaller size.—ED.]

VARIETIES OF POLYOMMATUS PHLÆAS, SYRICHTHUS ALVEOLUS, AND TRACHEA PINIPERDA.—While collecting on the Downs near Brighton, during the last week in May, I captured a variety of *Polyommatus phlæas*, in which the copper band on the hind wings is reduced to a couple of small spots. I also took at the same time a specimen of *Syrichthus alveolus* similar to that figured in Newman's *British Butterflies*, under the name of var. *lavateræ*. From March 17th to May 17th, I bred a nice series of *Trachea piniperda*, from larvæ taken in this district in the previous July. Among them were one or two specimens of the gray form, and there were intermediate specimens connecting this with the type.—H. PACKHAM, 29, St. John's Road, Croydon. *Dec. 3rd*, 1890.

LYCÆNA ALEXIS WITH A ROW OF BLACK SPOTS ON MARGIN OF HIND WINGS.—I am sending round the spotted var. of *Lycæna alexis*, that seemed to attract some attention in another basket. This is a constant and by no means rare var. in this locality, and I have taken a good series of them. I should like to know if it has been taken elsewhere, or if it has received a name or not.—P. H. RUSS, Culleenamore, Sligo. *Nov. 24th*, 1890.

I have often taken *Lycæna alexis* with dotted border, but have not seen such a distinctly marked one as Mr. Russ's example.—W. REID, Pitcaple, N.B.

Lycæna alexis, with spots on the hind wings, and also *L. adonis*, similarly marked, occur everywhere, but the specimen of Mr. Russ is very distinctly dotted indeed. Sometimes, but very rarely, the marginal markings on the hind wings are ocellated beneath with bright scales. Thus I have both *L. alexis* and *L. corydon* assimilating *L. ægon*.—SYDNEY WEBB, Dover.

VAR. OF GONOPTERYX RHAMNI.—When collecting at Riddlesdown on August 12th, 1890, I took a female specimen of *G. rhamni*, having the usual yellowish green of the underside almost entirely replaced by faint purple; when contrasted with the type, the effect is very striking. I took the insect as it was drying its wings, it is therefore in splendid condition.—W. MANSBRIDGE, Luther Place, Horsforth, near Leeds.

TWO FORMS OF SPILONOTA ROBORANA.—We get two forms of *S. roborana* at Portland, the ordinary form, and a form with a yellowish tinge, in which the dark markings are much lighter than usual. Both these forms and *S. incarnatana* occur amongst *Rosa spinosissima.*—N. M. RICHARDSON, Weymouth.

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ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Anthocharis cardamines ab. nov. *cinerea* Newnham. Shropshire. *Ent. Rec.* 1890, 242.

Conchylis (*Eupœcilia*) *erigerana* n. sp. Walsingham. *E.M.M.*, 3. This is, in part, what was called *anthemidana* by McLachlan and Barrett. It has been found at Shoreham, in Kent, near London, on the Norfolk-Suffolk border, and near Norwich. The larva feeds in the flowers of *Erigeron acre.*

Tinea subtilella Fuchs, Richardson, *E.M.M.*, 14. Eight specimens were taken at Portland. The species bears some resemblance to a very small *T. bisselliella.*

Tachyptilia populella var. nov. *minor* Tutt, *Ent. Rec.*, 1890, 244. Deal.

Gelechia (*Anacampsis*) *sparsiciliella* n. sp., Barrett. *E.M.M.*, 7–8. Near Pembroke. Peculiar for having pale blotches at the base of the costal and dorsal cilia.

Symmoca signatella H.-S., Griffith. *E.M.M.*, 8. Near the London Docks. A species of Gelechiidæ, no doubt imported with some cargo. Seven specimens were found.

A. G. Butler. "Further notes on the synonymy of the genera of Noctuites." *Trans. Ent. Soc. Lond.*, 1890, 653–691. This paper contains references to a few British species. *Nonagria geminipuncta* is said to be congeneric with *Oria* (*Tapinostola*) *fulva. Ommatostola*, Grote, is made to include our *Nonagria cannæ*, *sparganii*, *arundinis* and *lutosa. N. brevilinea* has been referred by Mr. Tutt to *Leucania*, so that only one British species, *N. neurica*, is left in *Nonagria. Hadena* sens. str., Guen., is considered a group of *Mamestra. Glæa*, Hbn. is used for *vaccinii* and var. *ligula* (our *spadicea*, so-called).

COLEOPTERA.

Pityophthorus (*lichtensteinii* var.?) *scoticus* nov., Sharp MS., W. F. H. Blandford. *E.M.M.*, 15. This insect was taken at Braemar, and is provisionally referred to *lichtensteinii*, but it is the *P. scoticus* of Dr. Sharp's MSS., and probably a valid species. In the same valuable paper the so-called *P. micrographus* of our lists is referred to *P. pubescens* (Marsham), which is better known by the later name *P. ramulorum* Perris. It is doubtful whether we have the true *P. micrographus* Gyll.

HOMOPTERA.

James Edwards. The British species of the genus *Cicadula*. *E.M.M.*, 27–32. A useful paper, with a synopsis of the species. *C. fieberi* n. sp. is described, and the following are added to the British list: *C. opacipennis* Leth. (Norfolk), *C. punctifrons* Fall. (Woking), *C. fasciifrons* Stal. (Norfolk), and *C. cyanæ* Boh.

DIPTERA.

Pulex gliris n. sp., C. W. Dale. *Brit. Nat.*, 5. Found on dormice in Dorsetshire. No description is given, and it may not be a valid species.

—T. D. A. C.

NOTES ON COLLECTING, Etc.

THE RETROSPECT OF A LEPIDOPTERIST FOR 1890.—In commencing a new year, it appears advisable to have a glance through last year's work from an entomological point of view, and, in so doing, briefly summarise the result of the year's work. The collectors of Lepidoptera, who consider the season "good" or "bad," in direct proportion to the number of specimens captured, and not at all in proportion to the observations made, or problems worked out, will give varied opinions. In several parts of Scotland and Ireland, the season was on the whole an exceptionally good one, whilst, in other parts, the reverse has been the case. The total absence of NOCTUÆ at sugar, except on very exceptional occasions, has made the season in most parts of England a bad one, but it is doubtful whether most species in the other groups have not been as plentiful as usual, although the high winds and occasional soaking rains in parts of June, July and August, made them more than usually difficult to obtain; and the Macro collector who, too often perhaps thinks of nothing but making a "bag" of something, and who is lost if ordinary methods of collecting fail him, had plenty to grumble at. But those who worked hard made very good "bags," and whilst northern collectors found *Noctua sobrina*, *Aplecta occulta*, *Agrotis agathina*, *A. pyrophila*, and many other good species more than usually abundant, the southern ones found *Agrotis lunigera*, *A. pyrophila*, *A. lucernea*, *Heliophobus hispidus*, etc., in more than usual plenty; and it is well to remember that when sugaring fences, trees, etc., produced no results, the sugaring of flower-heads often paid remarkably well. Among the Diurni, the overlooked *Hesperia lineola* was turned up in great numbers, and proved itself, as had been expected, one of our locally abundant species. Among the SPHINGIDÆ, the breeding of hybrids of *Smerinthus ocellatus-populi* was perhaps the most noteworthy feature. The SESIIDÆ produced one *S. allantiformis*, and a good lot of *S. sphegiformis*, whilst *S. philanthiformis*, *S. chrysidiformis* and *S. formicæformis* all turned up in more or less abundance. Among the LITHOSIIDÆ, the turning up of *L. sericea* (*molybdeola*), and the abundance of *Eulepia cribrum* were perhaps the two most noteworthy features, while among the BOMBYCES, the capture of *B. trifolii* on the Lancashire coast appears to be the only fact worthy of record. Of the NOTODONTIDÆ, *Dicranura bicuspis* and *Lobophora carmelita* alone appear noteworthy. Among the NOCTUÆ, the addition of *Plusia moneta* to the British fauna, and the capture of *Caradrina ambigua* and *Leucania vitellina* are the events of the season, whilst the re-occurrence of the splendid form of *Hydræcia* var. *lucens*, of the more than usual abundance of *Apamea ophiogramma*, the capture of *Nonagria concolor*, *Leucania brevilinea*, the fine vars. of *Aporophyla lutulenta* (?), and the abundance of *Triphæna subsequa* in the Forres district, are worth perhaps a passing notice. The breeding of *Eupithecia extensaria*, *Cidaria reticulata*, and *Phorodesma smaragdaria* in some numbers are the only facts that appear worth noticing among the GEOMETRÆ. The capture of *Crambus myellus* in Scotland, a few specimens of the true *Crambus contaminellus* and *Melia anella* at Deal, and *C. paludellus* among the CRAMBIDÆ, and the determination of the new (probably imported) *Aphytoceros vagans* among the PYRALIDÆ are perhaps the only facts worth recording. Among the TORTRICES many species that used to be rare are now obtained regularly,—*Tortrix piceana*, *T. lafauryana*, *T. decretana*, *Phoxopteryx upupana*, *Eupœcilia manniana*, etc. Among the PTEROPHORINA, the abnormal abundance of *Aciptilia spilodactyla*, and the re-occurrence in some plenty of *Platyptilia isodactylus* are the only facts worth recording. The TINEINA appear to have been as well worked as usual, but there is very little of the work done recorded, except by Dr. Wood and Mr. Nelson M. Richardson; and although it may be assumed that the hands of Messrs. Threlfall, W. H. B. Fletcher, Eustace Bankes and Bird have not lost their cunning, the record of their work is sought for in vain.

We may turn from collecting to Societies. Probably at no time during the last half century, has Entomology had so many adherents. The position of the Entomological Society of London is more than assured, and its long roll of members includes almost all the leading entomologists in the kingdom. It surely should include *all*, and no entomologist should begrudge supporting this Society, which represents as it were, our highest aims and ambitions as scientists. Besides, a member gets more than his money's worth in the Reports of the Society, which no entomologist now can really do without. Of the other London Societies, the City of London Society, which as the Haggerston Society, collected together for many years the adherents of our study from the East-end of the metropolis, has, in a more central position, enlarged its sphere of usefulness, and during the last two years its roll of members has steadily increased, and is still increasing; and since the system of reading papers at almost every meeting was adopted a few months ago, a steady increase in the number of members has resulted. This method of reading papers will continue, and I am at liberty to say that sufficient papers have been promised to fill every meeting until the winter session is ended. The South London Society, which has undergone certain chronic fits of elevation and depression since its commencement, reached its zenith about two years ago and for some time enjoyed great popularity. Perhaps this has not been altogether maintained, although the ordinary meetings are now more than successful. The failure of the Council to publish the Annual Reports and their inability to print the scientific papers read at the meetings, have been probably two elements in the partial failure to keep the high position attained. The former, if brought out to date, would be a strong connecting link with the country and outlying members, who cannot attend the meetings and yet pay their subscriptions. The second is a serious item, for, if a scientific paper be worth anything, it will always find room in one of the magazines, and a man who spends a considerable time on a subject, will always prefer sending it to a magazine, where it will be presented to a large circle of readers and maintained in a permanent form, than to read it at a meeting, after which no more will be heard of it. The Liverpool, Birmingham, and Yorkshire Societies are all in an active state, and the number of Natural History Societies in the country is rapidly increasing. In fact, it is the exception rather than the rule to find a large provincial town without one.

Passing from the Societies to our literature: The *Transactions of the London Entomological Society* occupy the first place. They are splendidly got up, and the papers are always of the highest order and generally exhibit a great deal of original research. Of the magazines, the *Entomologist's Monthly Magazine* is *facile princeps* from a scientific point of view, and, whilst the advanced entomologist would often be in an awkward fix without it, it is not altogether without interest to the collector. The *Young Naturalist*, now the *British Naturalist*, contains a large amount of general information, but most of the contents relate to entomology. The *Entomologist*, for many years the popular magazine of this country, changed its proprietor and editor in the early part of the year, and, in the 1890 volume, above one-sixth of its contents consists of descriptions of insects from India, China and Japan, and its new owner, apparently, wishes it to become a purely technical magazine. To fill the position vacated by the *Entomologist*, our own magazine was started. That it has "taken on" goes without saying, and I suppose no entomological magazine can point to 60 entomologists who have subscribed articles and notes to any one number, as was the case with our last (No. 9) number; nor perhaps, has there been an entomological magazine published before, which has so immediately become popular as has the *Entomologist's Record and Journal of Variation.*

Turning to general scientific matters, *Variation* has kept well to the front, and has now become a recognised part of our scientific work, and those who commenced by jeering, have ceased to scoff and become ardent students of the subject. As we devote a special column to the subject, I need not point out how much better it would be, if those interested in the subject would strive to keep their records together, where they can readily be found and referred to, rather than spread over several sources and mixed with other matter.—J. W. TUTT. *January 1st*, 1891.

NOTES OF THE SEASON OF 1890 (LEPIDOPTERA).—*York.*—The season here has been anything but a good one, the only redeeming feature is, that I have again been able to get *Eupithecia albipunctata* larvæ in some quantity. For the last six or seven years I have only been able to find odd ones.—G. DENNIS, Tower Street, York. *December*, 1890.

Liverpool.—The rain here has put a stop to almost everything in the way of imagines, but larvæ are pretty plentiful. I took a large quantity of *Nyssia zonaria* larvæ this year, and on examining the pupæ the other day, found that most had the wing markings showing through the pupa cases. None, however, have emerged up to date. I am anxiously awaiting the next move. I have previously bred one or two in September, and remember one being captured in that month; but, for them to emerge (or prepare to do so) *en masse* in September is a novelty. —GEORGE A. HARKER. *September* 18*th*, 1890.

Lyndhurst.—The autumn larvæ seemed fairly plentiful at Lyndhurst on September 15th and 16th. I took by beating on sallow—*Apatura iris* (3), *Trichiura cratægi* (8), *Ephyra orbicularia* (20), *Lobophora sexalisata* (21), *Eucosmia undulata* (2), *Cabera exanthemaria*, *Dicranura furcula* (5), *Notodonta ziczac* (2), *Smerinthus populi* (1), *ocellatus* (1), *Dasychira pudibunda* (1), *Amphidasys betularia* (2), *Selenia illunaria* (5). On birch—*Notodonta dromedarius* (3), *Cidaria corylata* (17), *Drepana falcula* (4), *D. lacertula* (5), *Notodonta dictæoides* (1), *Cabera pusaria*. On alder—*Hypsipetes impluviata* (4 in 1½ hours). On Scotch fir—*Fidonia piniaria*, *Macaria liturata* (13), *Odontopera bidentata* (1), and 1 unknown about the size of *Macaria liturata*, only nearly black—a Geometer—and several small *Ellopia fasciaria* which I replaced. On beech—*Heterogenea asellus* (1 after about 1 hour's search), not a bad bag for a bad season Whether I shall get *iris* and *cratægi* through time will show. *Iris* are sleeved out in the wilds. What am I to do with *cratægi*? *Smerinthus tiliæ* pupæ have been plentiful at the foot of limes and elms and *Sphinx ligustri* fairly common; I have taken some dozen—not more.—G. M. A. HEWETT, Winchester.

Warrington.—By beating birch I have taken larvæ of *Viminia menyanthidis*, *Cuspidia leporina*, *Notodonta dictæoides*, *N. dromedarius*, *N. camelina*, *Drepana lacertula*, *D. falcula*, *Hadena pisi*, *Saturnia carpini*, and *Amphidasys betularia.*—T. TUNSTALL, Warrington. *Nov.*, 1890.

Minehead.—I spent the first week of August in the neighbourhood of Minehead. I did no night work, so cannot give my experience of sugaring during the time, my chief object was to work for varieties of *Hypsipetes elutata.* I was rather late for it, but still managed to procure some fine vars., notably one, which I have placed in the Exhibition Box. This specimen was taken near Porloch, sallow and whortleberry both abounding in the locality; but I rather assume that it had fed on sallow, as all the bilberry forms seem to be a great deal smaller, and, I assume those feeding on whortleberry would be similar. At the top of the Porloch Hill on the Lynton and Synmouth Road, I obtained specimens of *Melanippe galiata* and *Larentia salicata*, and near Minehead I captured one specimen of *Stilbia anomala* —E. C. DOBRÉE FOX, Castle Moreton. *November*, 1890.

Donegal, *Wicklow* and *Howth.*—The weather of August was bad. In Donegal, I found it wet nearly every day, and ragwort almost unproductive. I took *Stilbia anomala* (one ♂) on the wing, on the coast of Lough Swilly, but saw no more of them there. That was on August 18th. The same night, I took *Miana literosa* and *Noctua c-nigrum* at ragwort. In a young plantation of pines, among heather, there were numbers of *Cidaria immanata* (?), though not so many as last year in the same place. In the daytime you had only to walk into the wood and some were sure to rise from the stem of every Scotch fir. In Wicklow at the end of the month *Hydræcia nictitans* (which is very scarce at Howth) was most abundant. In the full sunshine, it was hard at work sucking honey from the ragwort; and at night it still worked away. At Howth, on September 2nd, a couple of *Neuronia* *popularis* came to light, and on the 3rd, I took a couple of *Stilbia anomala*, at the top of the low cliffs. On some of the following nights I took *S. anomala*; the best night being September 9th, when my son and I took nine *anomala* and five *Agrotis agathina*. But some of each turned out to be very much worn. *Anomala* has a curious way of flying towards the lamp, and then dropping into the heather. If you wait, it generally climbs up and flies along the top of the herbage towards the light, when it is not difficult to take. But it is very easily injured, and lives in such windy places that the specimens are often worn. I was surprised to find a female one night on a post which had been sugared two days before. I also took a female at the flowers of *Erica cinerea*. But on the whole, the females seem much scarcer than the males and also more battered. On the 9th, *Eubolia cervinaria* and *Epunda lichenea* came to light; one specimen of each. I bred two ♂'s and one ♀ of *Epunda lichenea* from larvæ taken in the garden in the spring. They emerged on the 4th, 5th, and 10th of September; on the 10th, one *Thera firmata* came to light and on the 11th I took a couple of *Acidalia marginepunctata (promutata)* on the cliffs.—G. V. HART, Dublin. *November*, 1890.

MOTHS AT FLOWERS OF TRITOMA UVARIA.—I have to record a similar experience to that mentioned by Mr. Beales in this (Dec.) month's *Record*. Between September 5th and 14th, 1889, while staying at Blackmoor, Liss, Hants., I visited frequently a row of Tritomas, and found moths plentiful, taking *Epunda nigra* (12), *Noctua neglecta*, *Xanthia citrago*, *X. cerago*, *X. silago*, *X. ferruginea*, *Hadena protea* (abundant), *Anchocelis litura*, *A rufina*, *A. pistacina*, *Agrotis suffusa*, *A. segetum*, *Phlogophora meticulosa*, and a few common Geometers. This year I visited the same place in equally hot and fine weather, on September 3rd, 4th, and 10th, and saw one *Rumia cratægata*, and nothing else. Like most of your correspondents, I have found sugar useless this year, wherever I have tried it.—WALDEGRAVE, 20, Bryanston Square, W. *December 17th*, 1890.

WORK FOR THE WINTER.—I took fifteen cocoons of *Bisulcia ligustri* on the 28th of November, under the moss on ash trunks. There is no need to pull off the moss and spoil the trees for another year. The cocoons are very hard, and can be found as lumps under the moss, mainly in the crevices, or, if there is no moss, pull off the runners of ivy, and they will be disclosed, or will be found adhering to the rootlets. *Dicranura furcula* pupæ may be found by searching the *dead wood* of sallows, either in the tree or littered round the roots. I have, in better years, taken ten in a day, but it is rather a severe test of eyesight. They are generally at the base of a divergent branch, but sometimes on the straight, and very often in the hollow where a branch has been pulled off. Dead wood of any kind, anywhere about the tree is freely used. There is also another very cold game to play. *Lithosia rubricollis* spins a little fluffy spider-like web under the moss on the oaks. I have not taken any this year, but was fairly fortunate last year. They don't spin up till well on into November.—G. M. A. HEWETT, The College, Winchester *December*, 1890.

REPORTED CAPTURE OF GONOPTERYX CLEOPATRA.—A Mr. W. Parsons, last month, is reported to have captured in a clover field near here, a male and female of this species in capital condition. The fortunate captor brought them in his collecting box to Mr. Griffin of this town, who identified them, and I believe they have since been sold to a Brighton collector. It is supposed, as there was foreign clover growing near where the captures were made, that the ova may have come over with seeds.—R. A. DALLAS BEECHING, Tunbridge Wells. *Oct. 6th*, 1890. [*G. cleopatra* is one of those unfortunate species which are occasionally reported to have been taken in England. Sometimes the specimens have been curious vars. of *G. rhamni*, at other times they have been *G. cleopatra* with strange histories. I should like to know what led Mr. Griffin to determine both the ♂ and ♀ as *cleopatra*, the ♀ being scarcely (if at all) distinguishable from ♀ *rhamni*. I should also like to know how, since *cleopatra* feeds on shrubs and *not* on clover, there can be any supposition that the ova came in clover seeds. Finally, did Mr. Griffin see the specimens alive? Who is the Brighton collector who bought them? What history was given him? and what has Mr. Parsons to say about the capture?—ED.]

LIGHT AT NEWBURY.—The moth-trap has, on the whole, been a success. Besides those mentioned (*Record*, p. 180), I have taken *Neuria saponariæ*, *Dianthœcia cucubali*, *D. carpophaga*, *D. capsincola*, *Ptilophora palpina*, *Notodonta camelina*, *N. dromedarius*, *Gortyna flavago*, *Caradrina blanda*, *C. alsines*, *Hecatera serena*, *Hadena genistæ*, *Pericallia syringaria*, *Ennomos erosaria*, *Cleora lichenaria*, *Acidalia holosericata*, *A. subsericeata*, *A. imitaria*, *A. emarginata*, *Corycia taminata*, *Strenia clathrata*, and *Coremia propugnata*, besides any number of commoner insects.—M. KIMBER, Newbury, Berks, *October 14th*, 1890.

HABITS OF EPIONE VESPERTARIA.—We found *Epione vespertaria* at Sandburn this July and August, in numbers, but I have not heard of any variety being found. This species flies most commonly between 5 a.m. and 10 a.m. Its flight lasts, may be, only for half an hour, and then as suddenly as the species appear they disappear. To obtain the ♀ you must search the grasses, etc. at night. This sex seldom rests upon its foodplant. I have one very fine variety in my cabinet, a ♀, with the markings and border of the ♂.—S. WALKER, York. *September 12th*, 1890.

SCARCITY OF DIURNI.—The season of the present year (1890) opened fairly well with the Diurni, some species being tolerably abundant, *Pieris napi* and *Gonopteryx rhamni* (hybernated) were decidedly above the average in numbers. As the season advanced, the state of things looked very gloomy, the usual July species either scarce or altogether absent, and many emerging much behind time, and this autumn has been almost a blank. I have not seen a single specimen of *Vanessa atalanta* or *V. cardui*, nor am I aware of any having been taken; *V. urticæ* has been scarce but *V. io* has occurred in fair numbers, and *Gonopteryx rhamni* has been common, males and females in equal numbers, which is unusual, as I have always found the males far more common than females. As an instance of the scarcity of butterflies, the following will show. During a walk of about twenty-five miles on September 14th through mixed country, with my friend, Mr. S. Russell, we did not see above thirty specimens; in five miles not a single butterfly was seen, not even a white, although we passed by numerous attractive gardens (in full bloom), fields and wood; such a thing I never before experienced at the time of year, and the weather was delightfully fine. I will give a list of the butterflies we met with, viz: *V. urticæ* one only, one or two *V. io*, three *G. rhamni*, not a dozen whites, and here and there an odd *Polyommatus phlæas*, *Cœnonympha pamphilus*, *Epinephele ianira*, and *Lycæna icarus*; a more scanty lot it would be difficult to imagine on a perfect autumn day, through five and twenty miles of fine and varied country along the Kent and Surrey border.—F. W. FROHAWK. *September*, 1890.

NOTE ON PHOXOPTERYX OBTUSANA.—I quite agree with Mr. Atmore (*Record*, p. 212) in his remarks *re Phoxopteryx obtusana.* In the summers of 1886, 1887, and 1888 I found it sparingly among oaks; last year I beat a few from hawthorn only, and early in June this year in the same locality I could only beat it from wild rose bushes where it was, on one particular day, more abundant than I had ever found it before. I am inclined to think the larva is a tree feeder, and that oak will be found to be one of its foodplants.—A. THURNALL, 144, Chobham Road, Stratford New Town, E.

ASTHENA BLOMERI.—With regard to obtaining ova from females of this species in confinement, I think I can help Mr. Mason (*Record*, p. 138). Rearing lepidoptera from the egg was a hobby of mine in England, and as I was living for about a year and a half at Tyntesfield, in Mr. Mason's district, where *A. blomeri* occurs fairly plentifully, I determined to rear the insect through all stages. Profiting by previous experience with *Asthena luteata*, I confined the moths in a large muslin-topped glass cylinder, with a sprig of wych elm in water, and found that they deposited ova freely. These are flattish, oblong, and of a sienna-brown colour, and are deposited close along the ribs on the underside of the leaves. My ova were deposited between July 13th and 17th, and began to hatch on the 21st.—C. D. ASH, Southport, Queensland. *October 28th*, 1890.

EMERGENCE OF APLECTA OCCULTA IN NOVEMBER.—When at Forres, in September, I got a few larvæ of *A. occulta* from Mr. Salvage, and, by his advice, I tried the forcing process. I kept them in the kitchen in a flower-pot, and fed them twice a day on dock, on which they grew very rapidly; when they were about full grown I shifted them to the breeding cage. Some of them pupated about the end of October, and on November 25th a fine female emerged, the next day a second female, and the day following another. Unfortunately, however, some of the larvæ have resisted the forcing, and apparently are determined to hybernate in the larval state.—WM. MILNE, 34, Thomson Street, Aberdeen, N.B. *December 1st*, 1890.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*December 18th*, 1890.—Mr. O. C. Goldthwait exhibited *Coremia propugnata* bred from females taken at Rochester and Chingford, showing a wide range of variation in the transverse band, also for comparison a bred series of *Melanippe fluctuata*, the two species showing parallel ranges of variation in the bands. The same gentleman also drew a comparison between Mr. Merrifield's inferences, based on the so-called temperature experiments, and some of Mr. Tutt's deductions as set forth in the *Record.* Mr. Tutt stated that he considered that temperature, moisture, etc., only affected the larval stage (although retardation might possibly affect pupæ in a slight degree), and that the results of Mr. Merrifield's latest experiments were probably due to in-breeding. Mr. Machin exhibited *Dicranura furcula*, *Lithocolletis insignitella*, *Incurvaria canariella*, *Œcophora stipella*, and other Tineina. Mr. Hodges, *Setina irrorella* var. *signata*, from the Isle of Wight, and two fine vars. of *Abraxas grossulariata*, the inner half of forewings being suffused with yellow. Mr. Quail, cocoon of *Saturnia carpini* with two exits, cocoon of *Simyra venosa*, etc. Mr. Battley, cocoons of *Cuspidia aceris.* Mr. Boden, *Phoxopteryx upupana*, and *Mixodia ratzeburghiana.* Of Coleoptera:—Mr. J. A. Clark exhibited a cabinet drawer of various species; Messrs. Cripps, Elliman, Heasler, Lewcock, Milton, and Newbery collections of the genus *Donacia*, which comprised seventeen species of that genus, the two unrepresented being *obscura* and *impressa.* Mr. Lewcock read a paper on the subject, and gave an account of the nomenclature, the life-histories, variation (melanism), and the methods of collecting the species, with lists of localities, etc. He referred to the misapprehension respecting the identification of *dentata* and *sparganii*, and the vague specific distinctions between *sericea* and *discolor* (*comari*), showing that the descriptions laid down in both Cox's *Handbook of Coleoptera*, and Fowler's *Coleoptera of the British Isles* failed in their purpose of identification. It was quite true that the extreme forms of the insects were very dissimilar, but there also existed various connecting links between them. He likewise produced over 100 specimens of the insects in support of his statements. In some of the specimens the antennæ were long, others of medium length, and the remainder very short. One very dark specimen (from Esher) had scarcely any tubercle at the sides of thorax, very short legs, and long antennæ. He commented on Mr. Newbery's exhibit which contained typical specimens of *sericea* and *discolor* from Scotland, Middlesex, and Surrey, with intermediate forms of the insects. In the discussion which ensued, Mr. Tutt pointed out, that it was remarkable, that the dark varieties of the species exhibited, were all uniformly small. Mr. Newbery, while agreeing entirely with Mr. Lewcock's observations on *sericea* and *discolor*, said that the misapprehension concerning the identity of *dentata* and *sparganii* was to be attributed to the tabulation in Cox's *Handbook.* Messrs. Cripps, Heasler, Milton, etc., also took part in the discussion.

January 1st, 1891.—Mr. Tutt exhibited a box of Lepidoptera received from Mr. W. Reid of Pitcaple, including a fine series of dark forms of *Agrotis pyrophila*; a very variable selection of *Triphæna orbona*, the fore-wings of which varied from light drab, through red brown, to almost black; *Melitæa artemis*, several fine vars.; a series of *Melanippe fluctuata* var. *neapolisata*; *Fidonia piniaria*, and *Abraxas grossulariata*, the males of which had a tendency to be very dark, while the females were comparatively pale. Mr. J. A. Clark exhibited a very variable series of *Dianthœcia conspersa* from Lewis. Mr. Heasler exhibited *Dromius meridianus*, *D. quadrimaculatus* and *D. quadrinotatus*, all of which he had taken during the Christmas holidays, also for comparison several other species of the same genus—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

South London Entomological Society.—*December 11th*, 1890.—Mr. South exhibited *Lycæna agestis* vars. *salmacis*, *artaxerxes* and *allous*. Mr. Adkin, a remarkably pale series of *Peronea hastiana* from the Isle of Man (these were very like some of the forms which may be obtained at Deal, but very unlike those from St. Anne's-on-Sea). He also exhibited *Hepialus sylvinus*, and drew attention to the fact, that in copulation, the ♀ holds to a twig by the fore legs. but the ♂ hangs free, and in this position they bear some resemblance to a dead leaf. Mr. Tugwell exhibited *Eupithecia satyrata*, with its vars. *curzoni* and *callunaria*; also a melanic form of *Eupithecia* referred to *satyrata*, *trisignata*, and *virgaureata* by different lepidopterists. Mr. Tutt remarked that it was next to impossible to name an isolated specimen of an extreme melanic variety with any certainty. Mr. Short exhibited the pale Portland form of *Epunda lichenea*; Mr. Farrant, a specimen of *Chrysophanus phlæas* var. *schmidtii*. Mr. A. J. Hodges exhibited cells of the mason wasp (*Pelopæus*) from Texas, whilst Mr. Billups made a most interesting exhibit of various *Ichneumonidæ*.

January 8th, 1891.—Mr. Tugwell exhibited series of *Miana strigilis* and *M. fasciuncula* and pointed out superficial differences which appeared to him fairly constant; he called attention also to the published descriptions of the larvæ by Newman and Buckler. Mr. Fenn pointed out that the descriptions of larvæ in Newman's book were very unreliable, also, that larvæ varied so much at different ages, that descriptions taken from solitary larvæ were of but little value. Mr. Barrett, although expressing his opinion that *strigilis* and *fasciuncula* were distinct, so far as he knew the species, yet agreed with Mr. Fenn's remarks about the unreliability of the published descriptions of the larvæ. Mr. Tutt stated that the previous speakers had proved that most of the published facts relating to these species were of an entirely superficial or unsatisfactory character, that if his observations (*ante*, pp. 242, 243) directed further attention to the species he would be quite satisfied, but that it was ridiculous to state that he must be wrong, in the present unsatisfactory condition of our knowledge. Mr. Adkin exhibited bred species of *Boarmia gemmaria* and *B. repandata*, also *Retinia buoliana* and *R. pinicolana* from various localities. Mr. Tutt exhibited, for Mr. Reid of Pitcaple, a long series of fine varieties (including some very dark forms) of *Agrotis pyrophila*; varieties of *Triphæna orbona* ranging from very pale grey to almost black, the banded forms being specially admired, and vars. of *Abraxas grossulariata*. This species, Mr. Tutt remarked, was comparatively rare in Aberdeenshire and those in the immediate vicinity of Pitcaple (introduced by Mr. Reid) had apparently developed sexual dimorphism, the ♂'s gradually becoming darker, and the ♀'s paler, than the introduced specimens. A long series of beautiful specimens of *Melanippe fluctuata* var. *neapolisata* with other very extreme forms, and a series of small *Fidonia piniaria*, chiefly females, completed a very interesting exhibit. Mr. Manger exhibited a box of Australian Coleoptera, some of which Mr. Billups remarked appeared to be common to Britain and Australia. —Ed.

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page* 234.)

Before leaving altogether the general question of an exciting cause, there are one or two points which we should not overlook in our inferences and experiments. The first is the influence of "heredity." Throughout my paper I have assumed that my readers would always take this comparatively and undoubtedly inconstant (in different species) factor into account. But, it appears advisable to mention the fact here, because, in certain experiments, its influence might be so potent, that it would be really the most powerful factor acting at the time, and yet its influence might be altogether overlooked. Under the artificial conditions of domestication, we know this power is a very great and important one, and there is no doubt, that what is applicable to the artificial conditions of life in the higher animals, must influence, more or less, insects kept under similar artificial conditions. Where insects have a normal tendency to vary, and where artificial breeding gives all sorts of strange varieties under apparently the same or similar conditions, it is manifestly impossible to conduct exact experiments with a species having the influence of heredity strongly developed, with any probability of arriving at a satisfactory result. I have, for example, in my collection, specimens of *Selenia illustraria*, which might belong to either the spring or summer brood, so far as colour is concerned, and which would puzzle me entirely if I did not know to which brood they really did belong. Captured specimens of this species not only give variations in colour (in the same brood), but slight variations in markings as well; in our breeding-cages the variation is more pronounced. It is manifest here, that in this species "heredity" would be a naturally strong factor, and, if we add to the natural hereditary tendency to vary, the increased hereditary influences produced by an artificial condition of life, and the result of possible interbreeding, we see how potent a factor it might become. But this is not all. This particular species (and there are many others similarly inclined) has not only a natural tendency for the specimens of each brood to vary *inter se*, but it exhibits strong dimorphic coloration in its broods according to season, so much so, that we talk of the dark spring brood and the paler summer one; and, although in nature, these colours are generally constant, and even moderately so in our breeding-cages, yet, added to the previous hereditary influences I have shown to be at work, we see how strongly developed the sum total of heredity is, and how useless for any purpose of exact experiment relating to colour or markings, this species becomes. I have dealt thus fully with this species because it not only exhibits the hereditary tendency to a very full extent, but it is unfortunately (probably because it is so hardy and easy to rear) the species which has been generally selected for temperature experiments.[1] The other species, *Ennomos autumnaria*, which has been used for experiment by Mr. Merrifield, is one which is much better suited for experiment, as its natural tendency to vary is less; but being excessively rare in Britain, the species is being interbred in vast numbers for our cabinets, and, in a few years, will be quite domesticated, and probably become absolutely useless for experimental purposes, as it is now (1889), more or less, from my point of view, for it is impossible to get new British stock except at very rare intervals. I think I have now written enough to show that experiments made under artificial conditions, are open to grave objection, and that we may not always assume that results are produced by the same forces in nature, as those by which similar results appear to be produced under our artificial methods of breeding.

The foregoing paragraph on heredity was written in the early part of the year 1889, and my assumptions now (Jan., 1891) appear to be receiving most positive confirmation. In the Report of the Meeting of the London Entomological Society, Dec. 3rd, 1890 (*vide Ent. Record*, vol. i., pp. 267 and

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[1] *It was unfortunately one of those selected by Mr. Merrifield.*

268), with regard to some further temperature experiments conducted by Mr. Merrifield, we read:—"Mr. Merrifield read a paper 'On the conspicuous changes in the markings and colouring of Lepidoptera, caused by subjecting the pupæ to different temperature conditions,' in which it was stated that the results of many experiments made on *Selenia illustraria* and *Ennomos autumnaria*, tended to prove that both the markings and colouring of the moth were materially affected by the temperature to which the pupa was exposed; the markings, by long continued exposure before the last active changes, but before the colouring of the perfect insect began to be visible; a moderately low temperature during this period causing darkness, a high one producing the opposite effect, and two or three days at the right time appearing in some cases sufficient. Dryness or moisture applied during the whole pupal period had little or no effect on either colouring or markings. Applying the facts thus ascertained, Mr. Merrifield said he had obtained from summer pupæ of *illustraria*, some moths with summer colouring and spring markings, some with spring colouring and spring markings, and some with summer markings but an approach to spring colouring. The specimens were exhibited. Mr. C. Fenn, who said he did not agree with Mr. Merrifield's conclusions, exhibited a very long and varied series of *Ennomos autumnaria*, all of which, he stated, had been bred at the same temperature. He expressed an opinion that the presence or absence of moisture, rather than differences of temperature, was one of the principal causes of variation." The members present appear to have been of opinion that Mr. Fenn's specimens, bred at the same temperature, exhibited a very much greater range of variation than did those of Mr. Merrifield, which were supposed to vary because of the differences of temperature to which the pupæ had been subjected. It appears abundantly clear that Mr. Merrifield's specimens would probably have varied (as Mr. Fenn's did) just as much under ordinary, as they did under special conditions, and that the variation in his specimens was probably due, as the variation in Mr. Fenn's specimens was apparently due, not to temperature, but to heredity, and other incidental causes combined.

The inference suggested by Mr. Merrifield, or, more correctly, the conclusion at which he arrived, appears directly opposed to the inference adduced from his previous experiment on *Ennomos autumnaria* (*Entomologist's Record*, vol. i., p. 231), and I should suppose that the temperature had really very little to do with the actual result, and that one might get as many results, and draw as many separate inferences, as one chose to make different experiments. If Mr. Merrifield's last inference be correct, it should be capable of proof by any competent and careful entomologist, who ought to be able, by dividing a batch of pupæ into two separate lots, and by treating them in the way Mr. Merrifield suggests, to obtain two sets of moths of different coloration, by subjecting them, just before emergence, to a high and low temperature respectively. But this is impossible, as collectors know who breed lepidoptera in large numbers and force their pupæ; and I can only repeat, that I believe the larval stage is the vital one, and that experiments on pupæ can give but negative results. Last winter, in January, I forced at a very high temperature a large number of specimens of *Mamestra persicariæ* and *Macroglossa fuciformis;* these were exceptionally dark, but those I left in a cool greenhouse, and which emerged much later in the year at a lower temperature, were equally dark, and I can only infer that the temperature to which the pupæ were exposed, did not affect the coloration, but that whatever tended to make these two broods darker than usual, must have affected the larvæ before they entered the pupal stage; and yet this is in direct opposition to Mr. Merrifield's inference, that the subjection of pupæ to a high temperature just before emergence, produces a pale coloration, and I can only assume that the variation in Mr. Merrifield's experiment was produced independently of the temperature, and was the result of some previous condition of the larval stage, or a simple result of heredity, or some other incidental circumstance not yet taken into account, and, in the case of *Selenia illustraria*, which Mr. Merrifield has been interbreeding for several years for other experiments, the result obtained may be, in part, due to a weakened (diseased ?) condition of the larvæ, brought about by interbreeding; but this phase of the subject is dealt with in another paragraph.

In close connection with heredity are the development of dimorphic seasonal forms, when one or other of the forms has melanochroic tendencies, and the inquiry as to how these forms may possibly be produced. With regard to "seasonal forms" Mr. Cockerell writes:—"*Papilio ajax*, spring form *telamonides*, Feld., and summer form *marcellus*, Bd. *Pieris protodice*, spring form *vernalis*, Edw., is smaller and darker than the summer form. *P. oleracea*, summer form often larger;

and wings thinner and purer white than spring form. *P. rapæ*, 'Further south (in the United States) the winter (spring) form tends to pure white on the upper surface' (G. H. French). *Colias eurytheme*, spring form *keewaydin*, Edw., smaller than summer form, duller yellow and with less roseate reflection, both sides more sprinkled with black scales, the orange patch on the fore wings not so marked, sometimes almost absent. *Phyciodes tharos*, seasonal forms *marcia*, Edw., and *morpheus*, Fb.; *P. phaon* also has seasonal forms. *Grapta interrogationis*, hybernating form *fabricii*, Edw., summer form *umbrosa*, Lintn.; 'There are about four broods in a season, and while those of the last or hybernating brood are the pale forms, the others are more or less mixed, as Mr. Edwards has shown' (G. H. French). *G. comma*, hybernating form *harrisii*, Edw., summer form *dryas*, Edw. *Lycæna pseudargiolus* vars. *lucia*, Kirby, and *marginata*, Edw., coming from pupæ which have hybernated, show coalescence of markings on the under side of the hind wings. *Selenia bilunaria* var. *juliaria*, Haw., and *S. lunaria* var. *delunaria*, Hb. In North America, owing to the great difference between the summer and winter climates, seasonal forms are often very marked. As a rule, the spring form, emerging from pupæ which have hybernated, is smaller and darker than the summer brood, a condition which has been attributed to the effects of cold while in the pupa stage. But, strangely enough, a moderate amount of cold appears to have an opposite effect, for in our climate the spring *Pieridæ*, which are dark in America, are distinctly lighter than the summer forms, and the imported *P. rapæ* would seem to have retained that character somewhat in America. Also, as regards size, I believe that it is found that the races of large silk-moths, which are bred on the cooler slopes of the Himalayas, are invariably larger and finer than those of the same species from the heated plains of India; and this has been attributed to their longer sojourn in the pupal[1] state, whereby they have more time for development. The only theory I can advance to harmonise these various facts may seem to many a somewhat unwarranted one, and I shall look with interest for any comments on it. The darker and smaller forms may be supposed always to be those whose development has been quick, the metabolism great in proportion to the growth, while the larger and lighter forms have developed more slowly, with a longer period of growth, and less intense metabolism; in short, as Mr. P. Geddes would say, the first have developed katabolically, the last anabolically. When eggs or seeds are subjected to a low temperature, although life is not necessarily extinguished, growth and metabolism cease. The winter in North America is sufficiently cold to have a like effect upon hybernating pupæ,—they live, but do not grow.[1] The summer comes on with comparative suddenness, and the hot rays of the sun throw them into the most intense metabolism, so that the imago emerges with the wing-structures, so far from having developed slowly and in the cold, presenting every evidence of rapid change. In a climate like that of England, however, the winter is not cold enough to entirely arrest wing-growth, and hence the spring emergences present usually some evidence of slow change accompanied by gradual growth. It will probably be objected to the above theory, that summer in America is at least as hot as spring, so why do not the summer forms present at least as much evidence of quick change? To which I can only reply, that I am inclined to suppose that the vital structures and organs of generation develop at a much lower temperature than the wings, of which theory confirmation will be seen in such examples as the normally wingless, but otherwise perfect, *Choreius ineptus*, which is said often to develop wings in unusually hot seasons. I hold, therefore, that the North American species hybernating in the pupal state attain a nearly perfect development of their vital functions before the spring, although wing-growth has been in abeyance; but those pupating and emerging in the summer cannot assume the perfect state until the time necessary for the growth of the vital and reproductive organs has expired, so that the wings, developing all the while, have no period of sudden quick change like those of the spring brood. The seasons in Europe were probably at one time much more marked, and possibly some of the Mediterranean species arose as summer forms of northern species, or *vice versâ*: for instance, in the genus *Gonopteryx*. *Colias eurytheme*, of North America, has in the summer brood an orange patch on the fore wings similar to that of *Gonopteryx cleopatra*, but the spring emergence has the patch reduced, and sometimes almost absent, thus resembling *G. rhamni*. Now, supposing the climate were to become more uniformly cold in the north and warm in the south, these seasonal forms would be transformed into geographical races, and ultimately species. Such may have been the origin of *G. rhamni* and *cleopatra*" (*Entomologist*, vol. xxii., pp. 27–29).

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[1] I should consider it impossible that a longer sojourn in the pupal state, could make them "larger and finer." One can understand that a longer sojourn in the larval state, with plenty of food, would act in this direction.—J.W.T.

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[1] Develop rather than "grow." I believe all size variations to be phytophagic, *and as such, to be* determined in the larval stage.—J.W.T.

I must say that I do not altogether follow Mr. Cockerell's reasoning here as to "growth" in the pupal stage. The foregoing paragraph certainly leaves me with the impression that Mr. Cockerell believes some change in the size of the imago may take place by growth, in the pupal stage. I believe myself that the size of the imago is entirely determined in the larval stage, and fixed as soon as the larva becomes a pupa; but that different degrees and rates of development may affect not only the condition of the membranous structure of the wing, but the scale structure as well, is very probable, and whilst not at all prepared to criticise Mr. Cockerell's statements as regards development and its effects, I do most certainly believe "growth," as determining size, impossible in that stage. I have before hinted that, possibly, delay in the pupal stage may to a small extent help to bring about such changes as occur in seasonally dimorphic species (although I believe all the greater changes result from delay, etc. in the larval stage); and since cold produces delay both in the larval and pupal stages, cold may thus indirectly influence the colour of insects to a very slight degree. But I cannot leave out of account the fact, that in nature, cold does not have the least tendency to produce a dark coloration, and that the arrest accompanying extreme cold tends to produce, as a rule, pallid ill-marked specimens, with a tendency to become generally unicolorous, apparently the result oftentimes of ill-developed pigment in the scales.

With regard to seasonal forms in Britain, we may consider a few cases. *Pieris rapæ*. The early brood (May and June) specimens are much whiter with us than those of the summer brood. I think this affords one of the most striking proofs of the absence of the effect of cold on the pupal stage. *Pieris rapæ* lays its eggs in August and September, pupates in September and October (frequently in larval stage under four weeks), remains as pupa exposed to cold all the winter, and emerges in May as a pale form, frequently with the dark spots obsolete and therefore perfectly white. Eggs of the summer brood are laid in May, larvæ feed through June and July, pupate July and August, emerge August and September, the imagines being comparatively dark, having dark tips to wings, and distinct black spots. Here it is impossible for cold, acting on the pupæ, to have any effect in the direction of darkening the colour, as those exposed to the winter cold are the paler forms, and I can only suppose that the retardation in the early larval stage, aided by "natural selection," is the true active cause of the darkening, as the pale specimens, with their undersides brightly yellow are more protected in early spring, when the more common *Cruciferæ* are in flower (white or yellow) and the leaves are bright. In the summer the insects assimilate by means of their darker colour (especially greyer undersides) more closely to the darker leaves. The allied *Pieris napi* has imagines of the spring brood with the ground colour dusky, markings dusky-greyish; the summer imagines have the ground colour white, markings black. Comparing the two species, my experience points to the second brood of *P. napi* being in the larval stage longer than *P. rapæ*, and I have frequently known larvæ to live from early August until October before pupating. Although equally common perhaps, the habits of these two species are very different, and whilst *P. rapæ* is more especially addicted in its early stages to open cultivated grounds, *P. napi* prefers marshy land, ditch sides, shady rides in woods, etc., so that environment and "natural selection" undoubtedly have considerable effect. I still consider, however, that the study of the undersides is the more correct method of dealing with all our butterflies, from the point of view of "natural selection," but in these species the upper sides are comparatively a reflex of the undersides, *napi* being the darker in the early brood, and very similar to *rapæ* in the summer brood. The spring specimens of *Lycæna* appear to vary somewhat in a proportionate degree to the length of time passed in the larval stage, and the peculiar habits of the respective broods.

(*To be continued.*)

SCIENTIFIC NOTES.

THE GENUS DONACIA, Fab. (*continued from* p. 280).

D. limbata, Panz.—Known as *D. lemnæ*, F., in Sharp's *Catalogue of British Coleoptera* (1871), and in Fowler and Matthews' *Catalogue of British Coleoptera* (1883). This is another of the purple-striped species. but the stripe is at the sides of the insect in this case, and there is also a purple blotch near the base on each elytron. Rather common in Kent, Surrey, and other southern counties. I have taken it at Sunbury, Farnham, Wanstead, Walthamstow, etc., chiefly on *Sparganium*. Mr. Heasler took a number at Deal in 1890. Messrs. Newbery and Cripps have also captured it in Kent; Mr. Bennett at Hastings; and Mr. R. Gillo (on *Iris*) in the Bath district.

D. bicolora, Zsch.—Formerly called *D. sagittariæ*, F., in Sharp's *Catalogue* (1871) and Fowler and Matthew's *Catalogue* (1883). The species is readily distinguished from the preceding in being unicolorous, broader, and having more impressions. Generally of a lighter colour, but occasionally one meets with dark coppery specimens, and sometimes these dark varieties are mistaken for *D. limbata* by the inexperienced coleopterist. I have never taken very many, at the most only eight or nine in one day. My series was captured at Farnham (Surrey), and on the flashes of Basingstoke Canal; principally on the yellow iris and the arrowhead. Also taken at Deal by Mr. Heasler in 1890.

D. obscura, Gyll.—First recorded in the *Entomologist's Annual* (1860) as being taken by Mr. Constantine near Glasgow. "Very nearly allied to *D. lemnæ* (our present *D. limbata*), from which it differs in its more sombre colouring, in having the prothorax transverse, the anterior angles more pronounced and slightly reflexed, and without tubercles, and the base of the elytra, from the humerus to within a short distance of the suture, thickly strewn with punctures" (*Annual*, 1860, p. 147). Canon Fowler (*Coleop. Brit. Isles*) states that it is taken "on flowering *Scirpus* and *Carex* in May." The localities given are: Arundel (S. Stevens); Mabberley, Cheshire (Chappell); Scotland, Solway district, Dumfries (Sharp and Lemmon); also recorded doubtfully from the Tay district. I know of nothing authentic respecting its occurrence in the south of England.

D. thalassina, Germ.—Frequently confounded with *D. linearis*, from which it may be readily distinguished by the teeth on the hinder femora. The legs also are unicolorous. This is perhaps the commonest species of the genus in Surrey. I have swept as many as 250 specimens in one day. It is found at the Black Pond, Esher, on the banks of Basingstoke Canal, Farnham; also at Sunbury, Wanstead Park, Deal, Hastings, and many other localities. This species also has a melanic tendency, especially is it the case with those found at Woking, and sometimes the elytra are entirely purple.

D. impressa, Payk.—Said to be closely allied to the preceding species. Beyond having seen some specimens in Mr. Champion's collection, I know nothing of it.

D. simplex, F.—Familiar to most coleopterists as *D. linearis*, Hoppe. This species is generally supposed to be the commonest of the genus. It is certainly common at Hackney Marshes, also in the small streams at Sunbury and Shepperton, and seems to have a preference in these localities for running water. I have not found it at Woking, and know of but a single specimen captured near the Black Pond, Esher. There is no possibility of mistaking this for any other species. It is found on *Sparganium*, rushes, and other aquatic plants in June and July.

D. vulgaris, Zsch.—Named as *D. typhæ*, Ahr., in Sharp's *Catalogue* (1871), and Fowler and Matthews' *Catalogue* (1883). Allied to the preceding species, but could hardly be confounded with it, having a broad reddish-purple band running down each side of the suture. The band is sometimes of a deep blue, and occasionally it is so faint as to require a strong lens to distinguish it. Two specimens without the band were captured by me at the Black Pond, Esher, in 1885; also, in the same year, a specimen entirely suffused with purple. The beetle occurs more commonly on *Typha latifolia* in June and July, but is found also on *iris* and other aquatic plants. Besides Esher, I have found it at Farnham and Walthamstow.

D. semicuprea, Panz:—It is to be hoped that the name of this species is now settled. In 1871 and 1883 Sharp calls it *D. semicuprea*, Panz.: in 1883, Fowler and Matthews call it *D. simplex*, F.; in Fowler's *Coleop. Brit. Isles* (1890) the term *semicuprea*, Panz., is again restored. *Pax vobiscum!* The insect is rather common in what some coleopterists describe as the "London district"—the said district includes rather a wide area, so wide, indeed, that I would recommend the term to persons who desire to altogether suppress the name of any locality in the south of England, when recording their captures. To revert to the subject, *D. semicuprea* occurs chiefly on *Sparganium*, rushes, etc., and is certainly very common where it occurs. The localities in which I have captured it are: Farnham, Sheire, Sunbury, Shepperton, Wanstead Park, Walthamstow, Hackney Marshes, etc.

D. clavipes, F.—Synonymous with *D. menyanthidis*, Gyll., by which name it is called by Sharp (1871) and Fowler and Matthews (1883). One of the largest species of *Donacia*. It occurs early, from about May 25th to June 25th. It may be later in some seasons, but its period is more regular than its congeners, never lasting more than about four weeks. I once met with a few dirty specimens in July, but, as a rule, I do not expect to find it after June. The favourite foodplant seems to be *Arundo phragmites*, in the old stems of which it may be found at the Black Pond, Esher, by anyone who does not mind wading for it, in May and June. As a fact, *Donacia* species are obtained in greater quantity in this way than by simply sweeping with the net. On one afternoon in 1885 Mr. Cripps and myself took 1,000 insects by wading in and picking the beetles off the aquatic plants. Mr. Heasler took a great number of this species at Deal in 1890.

D. cinerea, Herbst.—Formerly known as *D. hydrochæridis*, F. Many of the old names of the members of this genus were derived from the plants on which the beetles were found, and served very well indeed; but in accordance with the laws of priority they have, unfortunately, to be discarded. The present species differs from all others in our British list, inasmuch that the upper surface is closely covered with pubescence. The only occasion on which I had the good fortune to capture it was on Jubilee day, 1887, at Woking, when I netted six specimens. These were clinging to a species of reed.

D. sericea, L. (*D. proteus*, Steph.) and *D. discolor*, Panz. (*D. comari*, Suffr.).—The general characteristics of the insects described under these names are almost identical, and, at the time of writing, I know of no reliable feature by which they may be differentiated. Indeed, I doubt whether there are two distinct species. In the first place, the same variation in colour exists in each of the so-called species,—from black, blue-black, coppery, red, green, blue, in endless shades. The size also is as variable. In separating *discolor* and *sericea* the main points relied on by Mr. E. W. Janson (*Annual*, 1861) were "the structure of its antennæ and thorax, and its parallel elytra. In *D. comari* (*discolor*) the antennæ are comparatively short and stout, the third joint but little longer than the second, and very little shorter than the fourth; the anterior angles of the thorax are rounded and deflexed, and the callus is confounded anteriorly with the margin." These features are fully delineated in the plate issued with the 1861 *Annual*. Cox (*Handbook of Coleoptera*, 1874) tabulates by the joints of antennæ and shape of elytra, and also states that "the antennæ and legs [of *D. comari* (*discolor*)] are shorter and thicker," and elytra more coarsely punctured. Canon Fowler (*Coleop. Brit. Isles*) says:—It (*discolor*) may "be easily known by having the antennæ comparatively short and stout, with the third joint less elongate, and only a little longer than the second, and especially by the fact that the anterior angles of the thorax are rounded and deflexed, and the lateral callosities are much less marked and are confounded anteriorly with the margin; the antennæ and legs are sometimes partly ferruginous." The same authority also gives the preference to *sericea* in size. It would thus appear that an extreme form, having short and stout legs and antennæ, with very slightly marked tubercle, and elytra parallel-sided, would constitute what is usually known as *D. discolor* (*comari*). All other forms, of which there are many, including those with long, medium, and short antennæ; with tubercle slightly "hooked," and also blunted or nearly absorbed; legs long or short; elytra parallel-sided, or narrowing towards apex; these would all come under *D. sericea*.

It was pointed out by Mr. J. W. Tutt, at the meeting of the City of London Entomological Society, December 18, 1890, that the black forms of *D. sericea* exhibited, appeared to him to be of an uniform small size. This observation might perhaps tend to explain the darker colouring, but very little else.

The types exhibited by Mr. Newbery showed the Scotch form of *discolor*, as discovered by Mr. J. Foxcroft, in Perthshire, in 1854; also South of England forms of *discolor* and *sericea*, and the intermediate forms. The question which now presents itself is, "What constitutes a species in this case?" One or two of the distinguishing points of *discolor* may be found in *sericea* specimens; but if the three are combined in any one insect, then, according to our authorities, it is called *discolor*. The matter may be thus summed up: the insects described as *sericea* and *discolor* are probably varieties of one and the same species, or else we are unacquainted with the true *D. discolor*. It may be as well to add that these forms occur together at the Black Pond, Esher, Woking, Shepperton, Sunbury, Wimbledon, Deal, Walthamstow, and many other localities, generally in June and July, on rushes, *Sparganium*, reeds, etc.

D. braccata, Scop.—Known formerly as *D. nigra*, F. A large, robust species, without impressions on elytra. Taken in profusion about 1886, by Mr. Bedford Pim and the Rev. Theodore Wood, at Pegwell Bay. Also taken by Mr. Heasler, at Deal, in 1890; and by Mr. Cripps, at the Norfolk Broads. The insect is nearly always of a dark violet or black colour, and occurs on *Phragmites*, etc., in June and July.

D. affinis, Kunze.—The last of the genus. A much smaller insect than the preceding, and on this account readily distinguished from *D. braccata*. It occurs at Walthamstow, among *Sparganium*, on the large ponds in that locality. Also taken at Wimbledon by Mr. Newbery; by Mr. A. Piffard, Herts.—G. A. LEWCOCK, 73, Oxford Road, Islington, N.

GLANDS ON THE THORAX OF CERTAIN LEPIDOPTERA.—The acid glands (*ante*, pp. 237 and 238) are possessed by a number of Lepidoptera besides the species named, especially the cocoon-forming *Bombyces* and *Dicranura.* I have also noticed them in *Viminia myricæ.* While not doubting Mr. Griffiths' theory, that the acid, being distasteful to birds, is a protection to species possessing it, I cannot help thinking that the main use of the acid is to soften the cocoons at the moment of emergence, and anyone who has seen *Bombyx quercus* or *Dicranura vinula* at this moment, will be inclined to think so too. Just before the above species emerge, and at the exact spot where the insect will afterwards make its exit, the cocoon becomes saturated with moisture, and often, when the insect has its head and shoulders out, the acid will be seen flowing freely from the glands, and gathering in two beads in front of the thorax; at other times, the whole head and thorax will be saturated with the acid for some time after they emerge. The power of ejecting the acid is always strongest in a newly-emerged insect, they seem to lose it as they grow older.—WM. REID, Pitcaple. [This is quite a new suggestion to me, and a very probable one.—ED.]

SUDDEN DEVELOPMENT OF THE WINGS OF SOME LEPIDOPTERA.—I can adduce somewhat similar instances of the retarded, and then sudden wing-development, to that recorded by Mrs. E. Bazett, *ante*, p. 237. In 1877 I had some pupæ of *Lithostege griseata.* In one or two cases the imago emerged, and the wings were not formed till hours afterwards, and then with my aid, as will appear. Such insects were always very restless from the first, moving rapidly about the cage. On the first occasion I was tempted to throw the moth away, thinking that without doubt the result must be a wingless cripple. The idea, however, occurred to me that I would try what a good shaking up might do towards helping the development of the wings, so I transferred the insect to a small card-board box, threw about the box with some force, and then left it. Unfortunately I did not see the actual subsequent formation of the wings; but when I went to look about two hours afterwards, there was *griseata* with perfectly-formed and symmetrical wings. It may have been a sudden process, as that described with respect to *Chesias spartiata*, or it may have been a more gradual expansion. This I cannot tell, as I did not observe the wings unfold. I have tried the tossing about plan with other species, and with good results, though I regret that I have never been fortunate in seeing the wings actually formed.—JOSEPH ANDERSON, JUN., Chichester.

RETARDED DEVELOPMENT OF WINGS OF TÆNIOCAMPA STABILIS ON EMERGENCE.—To-day, I happened to refer to some notes on pupæ which I had dug in 1889, and find that, opposite a note on a pupa of *Tæniocampa stabilis*, I have written, "emerged March 26th, at 9.30 a.m., not fully developed until after mid-day." This would seem in some measure to bear out Mrs. Bazett's observation (*ante*, p. 237), though, in that case, no development took place for several hours, after which it apparently occurred suddenly and quickly. In the case of my *T. stabilis*, I think there was a certain amount of development at once, only the full development was an unusually long time in taking place. In connection with this, I remember wondering whether, if pairing took place directly after the emergence of the imago, this would prevent its proper development. That this was not the case, I had satisfactorily proved to me in one instance. On May 18th, 1889, a female *Platypteryx falcula* emerged in a box, where I already had a male of the same species, and the two paired at once, before the female had had time to develop at all. I rather thought that this would prevent the female developing. This, however, was not the case, the pairing had apparently no effect whatever upon the development, which took place in quite the normal manner.—J. A. MACKONOCHIE, South Park, Lincoln. *January 31st*, 1891.

CURRENT NOTES.

The members of the South London Society held their Annual Dinner on Tuesday, January 13th, the Vice-President, Mr. W. H. Tugwell, making a most able Chairman. For a scientific Society the members present did very well.

Lord Walsingham's Address to the Fellows of the Entomological Society, though short, appeared to be thoroughly appreciated. The chief topic touched upon was "Variation," and I must confess the Fellows looked rather more animated than they have done in previous years, when a list of the titles of every entomological periodical published, given in the language of almost every country under the sun, mixed with a long obit. of the scientific world for 12 months, has had a rather depressing (not to say sleepy) effect on many.

Mr. N. F. Dobrée of Beverley, Yorks, who has made the Noctuæ his especial study, and has paid particular attention to the geographical range and local variation displayed by this group, has determined to give up the study and sell his collection. It would be well if it could be preserved for reference in the Natural History Museum.

The January and February numbers of the *Entomologist* contain 32 pages of descriptions of species of Lepidoptera and Coleoptera from N.W. India and China.

Mr. Eustace Bankes records *Eupithecia togata* from the New Forest; *Butalis laminella* from the Isle of Portland, and *Tinagma betulæ* from East Dorset.

Mr. C. G. Barrett, in the *E.M.M.*, proves that Mr. Gregson's *Ephestia roxburghii* is only a melanic form of *E. elutella*. Mons. Ragonot was therefore wrong in keeping it as a distinct species, and Mr. South, following Ragonot, has perpetuated the error.

Seven new Fellows were elected by the Entomological Society of London at the last meeting. Country entomologists appear to think that some special qualification is needed. This is not so. Mr. Goss, Berrylands, Surbiton, will send applicants a copy of the Rules, etc.

The thirty subscribers, needed to enable Mr. Reid of Pitcaple, to collect by subscription, were obtained almost immediately. Many, unfortunately, sent in their names too late.

My friendly suggestions (*ante*, p. 285) *re* the South London Society have already borne good fruit. During the past week the Secs. have been able to issue a list of papers to be read at each meeting until May 28th. The Council have been so moved by my remarks as to ask for a public apology. Of course, I regret hurting the feelings of the members of the Council; but, that the outside members fully understand, that what I write is intended for the ultimate good of the Society, is proven by my election on the Council at the last Annual Meeting. I am sorry that I cannot find room to print the lengthy letter from the Council, and the reply which it would demand.

Erratum.—For "This," page 281, line 24, read, "*E. heydeniana.*" As at present constituted, the paragraph reads as if "This" referred to *erigerana*, which is incorrect.

VARIATION.

LYCÆNA ICARUS VAR.—The variety of *L. icarus* mentioned by your correspondents on p. 282, having a row of black spots on the margin of hind wings, was named *nigromaculata* in *Entom.* 1889, p. 99. Mr. South exhibited and remarked on this variety at a meeting of the South London Entomological Society on July 14th, 1887.—T. D. A. COCKERELL.

PARALLEL VARIATION IN COLEOPTERA.—It may not be uninteresting to note that the question of parallel variation in closely allied species seems to apply with equal force to Coleoptera as to Lepidoptera, and I would specially point out the *Coccinellidæ*; in this group we have three very variable species, viz., *Coccinella bipunctata*, *C. variabilis* and *C. hieroglyphica*, all of which range in colouring, from pale brown or reddish with black spots to deep black with or without a red shoulder spot on each elytron. One other instance I would mention, and that is in regard to *Dromius quadri-maculatus* and *D. quadri-notatus*; while collecting at Barnet this Christmas, I took a series of each of these insects, and, in both of my series, the variation of the basal spots on the elytra range from oblong ovate to nearly circular, with all the intermediate forms. *Dromius quadri-signatus* varies most probably in the same manner, but I have only a single specimen of this insect.—H. HEASLER, Peckham.

IS MIANA FASCIUNCULA A VAR. OF M. STRIGILIS?—The ease (?) with which the Armagh specimens of *Miana* (*ante*, p. 242) can be differentiated may be readily estimated. They were exhibited twice at the City of London Society, the members there agreeing with me, and wisely refusing to commit themselves. At the South London Society three different opinions were elicited, one member deciding differently on successive evenings. Messrs. Porritt, Tugwell, South, Fenn, Atmore, A. Robinson, and several others disagree as to how many specimens should be called *strigilis*, and how many *fasciuncula*, in a short series of nine specimens. Of course I agree with the opinions of all, as the three or four dubious specimens, I repeat, are equally well-named as either species. Yet many of my friends are ready to suggest that I am wrong, and want tuition in the art of separating them. Mr. South professes to distinguish them by the dorsal tufts, yet some of the Armagh specimens which he admits *fasciuncula* are better tufted than any *strigilis*; and, as Mr. Fenn pointed out at the South London Meeting (January 22nd), there is every phase of development in both species, and this scientific-looking phrase is utterly unreliable. My note has proved how easy it is to make a storm in a teapot, and how ready some lepidopterists are to write on any subject whatever. I still maintain that my specimens may be equally well-named as either species; and that, although "recent study may have disclosed that typical *fasciuncula* are red above and ochreous-fuliginous below," whilst "typical *strigilis* are differently coloured above and fuliginous-grey below," there are specimens of which I confess I know nothing, and about which lepidopterists in general certainly know less than I.—J. W. TUTT. *February*, 1891.

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Ephestia roxburghii, Gregs. This unfortunate species gets variously placed by different authors. Ragonot considered it a valid species; Hulst, in his recent (1890) work on the *Phycitidæ of North America*, places it as a synonym of *Plodia interpunctella*, Hb., giving the genus *Plodia* as distinct from *Ephestia*; and now Mr. Barrett (*E.M.M.*, p. 49) says it is a melanic form of *E. elutella*. Presumably Mr. Barrett is right, and so we must now write *Ephestia elutella* var. *roxburghii.*

In Mr. Hulst's monograph, *Ephestia kühniella* is quoted from North Carolina, New Mexico, Colorado, and Canada. It seems as if it were really a native of the Western States of America, after all.

Sericoris lacunana v. *hoffmanniana*, C. A. Teich, Warren, *Entom.*, 34 (under *Penthina*). This is a variety recently described from the Baltic, which Mr. Warren identifies with the Cambridgeshire fen form.

HEMIPTERA.

Aleurodes filicium, Goldi., J. W. Douglas, *E.M.M.*, 44. A Brazilian species found on ferns in the fern house at Kew Gardens, of course imported.

DIPTERA.

Homalomyia vesparea, n. sp., Meade, *E.M.M.*, 42, Newstead, *t.c.*, 41. Bred from larvæ found in nests of *Vespa germanica* in Cheshire.

Mydæa affinis, n. sp., Meade, *E.M.M.*, 42. Lake district.

Limnophora litorea, Fln., Meade, *E.M.M.*, 43. Grange-over-Sands, Lancashire.

ARACHNIDA.[1]

F. O. Pickard-Cambridge. Descriptive notes on some obscure British spiders. *Ann. Mag. Nat. Hist.*, January. A synoptical table of the genera of the group *Linyphini* is given, and on p. 78 *Leptyphantes pinicola*, Simon, is added to the British List, while on p. 80 a new species is described as *Tmeticus niger*. Both these spiders were taken on Helvellyn.—T. D. A. COCKERELL.

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[1] ARACHNIDA are not insects, but as Mr. Cockerell wishes the Bibliography of the Order to appear I have included them.—ED.

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON OF 1890 (LEPIDOPTERA).—*Inverness.*—I spent from the 1st of August to the 24th of September at Beananach on the river Dulnan, a beautiful spot in Inverness, about 15 miles N. of Kingussie, and standing at an altitude of 880 feet. Several lochs lie snugly hidden among the surrounding hills, many of which, clothed with thick forests of pine and fir, assume in the distant sunlight a hue of the deepest purple, a striking contrast to their less favoured brethren, on whose rocky heather-clad crags the sunbeams play in ever-changing shades of grey and ochre. Beneath the hills, stretches a vast expanse of purple moorland, here and there exchanging its brightness for the more sombre hues of a peat-bog, waving with the white cotton-grass and the delicate flowers of *P. palustris*; the whole air redolent with the fragrant sweet-gale (*Myrica gale*), and resounding with the ceaseless humming of the bees and many species of Diptera, improving the shining hours amidst the purple heather-blossoms, while ever and anon a large dragon-fly (*C. annulata*) darts past, handsomely clothed in black and yellow, seizing and devouring any luckless insect which happens to tempt its voracious appetite. It was in such a spot that I captured the following Diurni, all I took in nearly two months:—One *Argynnis aglaia* on August 10th, three fine specimens of *Cænonympha davus*, two ♀'s and one ♂, the ♂ was just drying its wings on a sprig of heather, this was August 18th, rather a late emergence? Two *Vanessa urticæ*, eleven *Cænonympha pamphilus*, eight *Lycæna icarus*, and several *Pieris brassicæ* and *P. rapæ*—a gloomier record even than Mr. Frohawk's (*Record*, p. 289). The moths, of which the Geometers formed the majority, were almost as poorly represented, being as follows:—*Cidaria immanata*, common on pine trunks; *C. russata*, two specimens; var. *centum-notata*, saw one, but lost it; *C. testata*, common on moors at an elevation of 3000 feet; *C. populata*, very common in pine woods and outskirts; *Ellopia fasciaria*, one; *Psodos trepidaria*, one; *Fidonia pinetaria*, common; *Dasydia obfuscata*, two; *Acidalia incanaria*, one; *Fidonia carbonaria*, two, all on the moor; several *Oporabia filigrammaria*; many *Larentia didymata*, good vars.; many *L. cæsiata*, nicely marked; a few *L. ruficinctata*; *L. salicata*, common, in pine or fir woods; *Emmelesia blandiata*, several; *Eupithecia centaureata*, *E. sobrinata*, *E. vulgata*, *Thera simulata*, *T. firmata*, all common in and on the outskirts of pine and fir woods; *T. simulata* showed a striking variety in shade. Where the pine trees and firs grow close together, and the moths are in the habit of resting on the trunks, a bluish-grey predominates, harmonizing exactly with the colour of the bark, but in open spaces where the ground is covered with dead leaves, needles, etc., and withered pine branches have accumulated, the chestnut colour greatly predominates, perfectly matching the red withered needles; often, when having marked a moth settle on the ground a few yards away (which they usually do when disturbed), I have been obliged to commence scraping around with a stick or something to start it up, being unable to distinguish it; the light variety above mentioned is equally hard to distinguish, always however settling on the tree trunks. All the following NOCTUÆ excepting the first three species were taken at light:—*Acronycta menyanthidis* at rest on a sprig of heather; *Xylophasia rurea* at rest on a paling; *Trachea piniperda* flying round flowers in sunshine; two *Agrotis tritici*; two *A.* var. *aquilina*; four *Anchocelis litura*; three *Noctua rubi*. Mothing, treacling and light (in the form of a moth trap) were all tried with the above unsatisfactory result. On an average the weather was fair, wind hardly ever in the East. September was the finer, though somewhat colder month. The only reason I can think of to account in any way for such an extraordinary scarcity of lepidoptera, is the fact that the whole neighbourhood *swarms* with *Formica rufa*; I have found them on the top of hills 1600 feet high, the moors are overrun with them, and so are all the roads and trees; every now and again, along the roads, one meets groups of three or four of these pigmy highwaymen, dragging along some wretched caterpillar or beetle many times their own size, making very slow progress however, for they rarely all pull in the same direction. Their chief rendezvous is in the pine woods, which are full of their nests, being composed of the loose friable mould mixed with the needles, and having a thick coating of the latter all over; some of them are very large, and must contain many thousands, the largest I saw was in the shape of a sugar-loaf, twelve feet in circumference at the base and two feet nine inches in height. Perhaps *F. rufa*, by devouring the larvæ, reduce the number of imagines. Those living in a neighbourhood infested by *F. rufa* would perhaps state their own views on the subject, saying whether they, too, find lepidoptera scarce.—D. H. S. STEUART, 66, Albert Hall Mansions, W. *February 5th*, 1891.

Leeds.—*Oporobia dilutata* was fairly common round Leeds in October; specimens were taken ranging from very dark bluish grey, to light grey. I did not once see the pretty banded form met with in the south. *Cheimatobia boreata* has been very common, judging by the remains under the trees. *C. brumata* of course has been common, and some good dark forms were met with. *Hybernia aurantiaria* I have only seen twice, one being a female. *H. defoliaria* does not appear to be common in this district. I have taken, however, a very nice form of it, in which both pairs of wings are of a uniform smoky brown, not dotted as in the usual unicolorous variety. I have never before seen anything like it. Amongst the NOCTUÆ two specimens of *Cerastis vaccinii* are all that I have seen.—W. MANSBRIDGE, Luther Place, Horsforth, near Leeds.

NOTES OF THE SEASON OF 1890 (COLEOPTERA).—On August 4th, Mrs. Johnson and I drove down to Lough Neagh, which is about 14 English miles from here. We stopped on our way at Churchill, as is our custom, in order to hunt the bogs there. There was however but little to be got. By beating birch trees I took *Rhynchites betulæ*, *Anoplus plantaris*, *Cœliodes rubicundus* and *Orchestes rusci*. Having arrived at Lough Neagh and appeased the pangs of hunger, we made our way to what is called Derrywarragh Island, a tract enclosed between the river Blackwater, the canal and Lough Neagh. Here, on the lake shore under stones, we took a good number of *Pelophila borealis*, together with *Bembidium punctulatum*, *B. bipunctatum*, *Philonthus laminatus*, *Ph. umbratilis*, etc. Mrs. Johnson was fortunate enough to get a specimen of *Silpha dispar*, but no amount of searching could produce a second. On the flowering rush (*Butomus umbellatus*) along the canal margin, I got a few *Donacia sagittariæ*.

Lowry's Lough is always a productive locality, and, as it is only two miles from here, I often take a walk out to it. On different occasions I took *Pelophila borealis*, *Blethisa multipunctata*, only a couple of them; *Cœlambus 5-lineatus*, in abundance as usual; *Dytiscus circumflexus*, a fine ♂; *Philonthus quisquiliarius* and its var. *dimidiatus*, Steph.; *Lathrobium quadratum*. A couple of bags of moss produced, with other things, *Myllæna dubia*, *Actobius cinerascens*, *Trogophlœus bilineatus*, *Encephalus complicans*, *Homalium excavatum*, *Erirhinus æthiops* and *Philhydrus maritimus*, the last two being represented by single examples.

In a pond formed in the remains of a quarry, I took *Gyrinus minutus* and *Hydroporus lepidus*. It is curious that this pond, which is not very large, is the only place about here that I get *G. minutus*.

In drains in the meadows, I found *Hydroporus memnonius*, *H. lituratus*, F. (*xanthopus*, Steph.), *H. vittula*, *H. atriceps* and *Dytiscus punctulatus*. Sweeping brought me *Anisotoma nigrita* off *Equisetum*, *Cassida equestris* off wild mint, and *Donacia linearis* off *Iris pseudacorus*.

The heavy rains at the beginning of November caused considerable floods, so I took my bag and started for the Mullinures, and brought in a weighty bag of flood rubbish. I repeated this performance more than once, but the first day, when the water had just risen, was far the best. I am accustomed to seeing great numbers of beetles coming out of moss, but I never saw such swarms as were in this flood rubbish. The curious part of it was that there was scarcely anything else present but Coleoptera. There were a few spiders and a couple of Hemiptera, but all the rest were beetles, they simply swarmed, and hosts paraded over my table, myself, and my study generally (the spiders, I may mention, were very partial to the top of my head, evidently considering my hair a superior place for spinning their webs). It would be useless to give a full list, but I may mention the following:—*Dyschirius globosus*, this is very plentiful in flood rubbish, but I never see it otherwise; *Bembidium mannerheimi*, *B. obtusum*, *B. doris*, *B. clarkii*, the first and last named were in swarms, in fact the meadows must contain hundreds of them. I was very pleased to get *B. doris* as I had not met with it before, and the only other Irish record is from Dublin. I have taken it since in moss at Lowry's Lough. *Amara aulica*, Panz. (*spinipes*, Auct., *nec*, Linn.), *Anchomenus gracilis* and *A. viduus*. These were the chief representatives of the Geodephaga. Among the Hydrophilidæ were *Helophorus æneipennis*, *Cercyon lugubris*, *C. analis* and *C. flavipes*. The Staphylinidæ were numerous, as might be expected in such a situation; among them being *Tachinus marginellus*, *Tachyporus brunneus*, *Actobius cinerascens*, *Lathrobium fulvipenne*, *L. quadratum*, *L. longulum*, *Cryptobium glaberrimum*, Herbst. (*fracticorne*, Payk.), *Sunius diversus*, Aubé, *Trogophlœus foveolatus*, *Lesteva sicula*, Er. (*punctata*, Brit. Cat.), *Evæsthetus ruficapillus*, *Platystethus nodifrons*, *Homalium excavatum*, *Euplectus ambiguus*, *Simplocaria semistriata*, *Longitarsus pusillus*, *L. luridus*, *L. brunneus*, *L. melanocephalus*, *Phyllotreta tetrastigma*, *P. brassicæ*, *Erirhinus æthiops* and *Cassida viridis*.—W. F. JOHNSON, Winder Terrace, Armagh. *December 23rd*, 1890.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*January* 21, 1891, *the* 58*th Annual Meeting*.—The Right Hon. Lord Walsingham, M.A., F.R.S., President, in the Chair. An abstract of the Treasurer's accounts was read by Mr. Herbert Druce, one of the Auditors, and the Report of the Council was read by Mr. H. Goss. It appeared therefrom that the Society had lost, during the year, five Fellows by death, and had elected twenty-seven new Fellows; that the volume of Transactions for the year extended to nearly 700 pages, and comprised twenty memoirs, contributed by seventeen authors, and illustrated by twenty-one plates. It was then announced that the following gentlemen had been elected as Officers and Council for 1891: President, Mr. Frederick Du Cane Godman, M.A., F.R.S.; Treasurer, Mr. Robert M'Lachlan, F.R.S; Secretaries, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; Librarian, Mr. Ferdinand Grut, F.L.S.; and as other Members of the Council, Prof. R. Meldola, F.R.S., Mr. Edward Saunders, F.L.S., Dr. David Sharp, F.R.S., Mr. Richard South, Mr. H. T. Stainton, F.R.S., Col. Charles Swinhoe, F.L.S., Mr. George H. Verrall, and the Right Hon. Lord Walsingham, M.A., F.R.S. It was also announced that the new President had appointed Lord Walsingham, Prof. Meldola, and Dr. David Sharp Vice-Presidents for the session 1891-1892. Lord Walsingham, the retiring President, then delivered an Address. After alluding to some of the more important Entomological publications of the past year, and making special mention of those of Edwards and Scudder in America, of Romanhoff in Russia, of the Oberthürs in France, and of Godman and Salvin in England, the President referred to Mr. Moore's courageous undertaking in commencing his *Lepidoptera Indica*, on the lines adopted in his *Lepidoptera of Ceylon*. Attention was then called to the unusual development during the past year of the study of those problems which have been the object of the researches of Darwin, Wallace, Weismann, Meldola, Poulton, and others, and to the special and increasing literature of the subject. In this connection allusion was made to Mr. Tutt's *Entomologist's Record and Journal of Variation*, to Mr. Poulton's valuable book, *On the meaning and use of the Colours of Animals*, and to the interesting and important papers and experiments of Mr. F. Merrifield on the subject of the variation in Lepidoptera caused by differences of temperature. After alluding to the International Zoological Congress held at Paris during the past year, and to the rules of nomenclature, which had been once more reviewed and revised, the President concluded by referring to the losses by death during the year of several Fellows of the Society and other Entomologists, special mention being made of Mr. E. T. Atkinson, Mr. J. S. Baly, Mons. l'Abbé de Marseul, Mr. Owen Wilson, Mons. Lucien Buquet, Mons. Eugene Desmarest, Prof. Heinrich Frey, Dr. R. C. R. Jordan, Mr. W. S. Dallas, Dr. L. W. Schaufuss, Dr. Hermann Dewitz, Mons. Louis Reiche, and Herr Peter Maassen. A vote of thanks to the President for his services during the year and for his Address was proposed by Dr. D. Sharp, seconded by Mr. M'Lachlan, and carried. Mr. M'Lachlan then proposed a vote of thanks to the other Officers of the Society, which was seconded by Mr. S. Stevens, and carried. Lord Walsingham, Mr. Goss, and Mr. Grut replied.

February 4th, 1891.—Mr. Frederick DuCane Godman, M.A., F.R.S., President, in the Chair. Mr. C. J. Gahan called attention to a larva which he had exhibited at the meeting of the Society on the 1st October last, when some doubt was expressed as to its affinities. He said that Professor Riley had since suggested that the larva was that of a dipterous insect of the family *Blepharoceridæ;* he was quite of the same opinion, and thought it might probably be referred to *Hammatorrhina bella*, Löw, a species from Ceylon. Mr. Tutt exhibited a long series of *Agrotis pyrophila*, taken last year by Mr. Reid, near Pitcaple, in Aberdeenshire, and remarked that this species had been commoner than usual last year in Scotland, the Isle of Portland, and the Isle of Man. He also exhibited long and variable series of *Melitæa aurinia* (*artemis*), *Triphæna orbona*, *Abraxas grossulariata*, and *Melanippe fluctuata*, all from the same locality in Aberdeenshire. The Rev. Canon Fowler exhibited a cocoon of *Deiopeia pulchella*, recently received from Lower Burmah. Mr. C. O. Waterhouse exhibited specimens of *Scyphophorus interstitialis*, a Mexican species, and *Aceraius comptoni*, a Ceylon species, recently taken by Mr. Bowring in his greenhouse. He also exhibited, on behalf of Miss Emily Sharpe, a specimen of *Daphnis hypothous*, Cramer, a native of Borneo, Java, and Ceylon, caught some years ago at Crieff, N.B. The specimen had long been confused with *Chærocampa nerii*, under which name its capture was recorded in *The Entomologist*, xiii., p. 162 (1880). The Rev. Dr. Walker exhibited a collection, including many species of Orthoptera and Scorpions recently received from Jerusalem. Mr. Frederick Enock read an interesting paper entitled "The Life-History of the Hessian Fly." This paper was illustrated, by means of the oxy-hydrogen lantern, with a number of photographs of original drawings showing the fly in all its stages and transformations. Mr. G. H. Verrall said he believed the Hessian Fly was no more a recent introduction into this country than the Cabbage White Butterflies. The discussion was continued by Mr. Godman, Mr. Enock, and others. Mr. Roland Trimen communicated a paper entitled, "On Some Recent Additions to the List of South African Butterflies." Mr. H. W. Bates communicated a paper entitled, "Additions to the Carabideous Fauna of Mexico, with remarks on species previously recorded." Mr. W. F. Kirby read a paper entitled, "Notes on the genus *Xanthospilopteryx*, Wallgr." Dr. D. Sharp contributed a paper entitled, "On the Rhyncophorous Coleoptera of Japan," Part 2.—H. Goss and W. W. Fowler, *Hon. Secretaries.*

City of London Entomological and Natural History Society.—*January 15th*, 1891.—Exhibits:—Dr. Buckell, a butterfly from India, with the undersides of wings marked like a dead leaf. Mr. Tutt, long series of intermediate forms of *Miana strigilis* and *M. fasciuncula*, and remarked on the impossibility of separating these specimens into two species, as there were no structural differences wherewith to distinguish them. In reference to the larvæ, he said that he had lately seen four descriptions, all of which were totally different, thus proving that the larvæ were very imperfectly known. Mr. Simes exhibited a specimen of *D. galii*, taken at Clapton, 12th August, 1890. Mr. Clark, a pinkish variety of *Aplecta occulta*, bred; also *Pogonocherus hispidus*, *Rhizotrogus solstitialis*, *Necrophorus mortuorum*, and *Blaps similis*. Mr. Heasler, a series of *Coccinella variabilis*. The Secretary read a paper by Mr. R.

Gillo, of Bath, on the "Colours of Animals." He stated that the present coloration of animals had been brought about by "natural selection" and the survival of the fittest, which tended to produce an effect advantageous to the animal. He divided the subject into eight parts, as follows:—

1. *Protective colouring.*—A very large number of animals have acquired a colour which harmonizes with their surroundings. In order to see this, we must study them in a state of nature, *e.g.*—the stripes of the tiger accord with the rank grass of the country which it inhabits; polar animals are white, and animals frequenting deserts are uniformly sand-coloured. 2. *Variability of colour.*—Animals which occur in different localities vary to suit their surroundings. Further, some animals, especially reptiles and fishes, have the power of changing colour when removed from light to dark places, or *vice versa.* Larvæ of *Amphidasys betularia*, reared amid green leaves and shoots, are green; while those fed among twigs assume the brown colour, with the exception of about 2 per cent., which are green. 3. *Warning colouring.*—Brilliantly-coloured animals are usually protected by stings, or are unpalateable to their enemies. Thus their conspicuous hues serve as danger signals, and help to secure their safety. Brightly-coloured larvæ are avoided by birds, while green or brown ones are frequently eaten. 4. *Mimicry.*—Animals protected by stings, or otherwise, are often mimicked by others, who thus share their immunity from attacks of enemies. Wasps are mimicked by insects of other orders. Some insects resemble pieces of stick, leaves, etc. 5. *Alluring mimicry.*—Certain animals allure their prey by imitating objects which are attractive to them. A species of *Mantis* from India resembles the flower of an orchis, thus attracting various insects on which to feed. 6. *Aggressive mimicry.*—A fly (*Volucella bombylans*), the larvæ of which feed in the nest of the Humble-bee, mimics the latter insect, and so gains access to its nest. 7. *Recognition markings.*—Animals which live in colonies usually develop some mark by which they are able to recognise one another. Rabbits are enabled to gain a shelter from danger by following the small white tails of others that are nearer their burrows. 8. *Sexual selection.*—Females of some species exhibit a preference for the most brilliantly-coloured males. This has led to the special adornment of the males, and to the general improvement of the species.

February 5th, 1891.—Exhibits:—Mr. Hodges, *Acronycta rumicis* and its var. *salicis*, *Leucania vitellina* from the Isle of Wight, *Emmelesia tæniata*, and specimens of *Anchocelis lunosa* and *Miana strigilis*, showing the range of variation. Mr. Battley, series of "carpet" moths; also, on behalf of the members of the *Record* Exchange Club, fine varieties of *Crocallis elinguaria*, *Cidaria populata*, *Arctia menthastri*, and *Noctua festiva.* Mr. Tutt, long series of *Larentidæ* to illustrate his paper. Mr. Milton, *Heliophobus hispidus*, *Noctua glareosa.* Coleoptera:—Mr. Elliman, *Mycetophagus atomarius*, *Litargus bifasciatus*, *Cicones variegatus*, *Dromius quadri-notatus*, *Sunius angustatus*, *Rhizophagus bipustulatus*, and other beetles. Mr. Milton exhibited *Nacerdes melanura*, *Alphitobius piceus*, *Carabus nitens*, *Calosoma inquisitor* and *Panagæus crux-major.*

The Geometrid genera—Melanthia, Melanippe and their allies.—Mr. Tutt said that he had chosen the geometrid genera of "carpet" moths because they exhibited, perhaps better than any other group, changes which were now in progress. It was generally accepted by scientific men that transverse bands on the wings of lepidoptera had been formed by the union of transverse lines, and that many species exhibited incomplete bands, the incomplete part being formed of wavy lines. Attention was drawn to the fact that the moths of these genera rested with outspread wings on rocks, tree-trunks, palings, etc.; and that, taking into consideration the probability of a more humid climate in the British Isles when they were more covered with wood, there was the consequent certainty of a natural darkening in colour of species with such habits; and since it might be safely assumed that the darker specimens with transverse lines represented an older form, the genus *Larentia* was probably one of the oldest genera in this group. As types of the changes that may have occurred, *Melanippe hastata*, *Melanthia rubiginata*, *Melanippe montanata*, *M. fluctuata*, and *Camptogramma bilineata* were dealt with at length. All these had, in one or other of the humid districts to the north or west of the British Isles, a form with dark ground colour crossed by transverse lines, the ground colour becoming whiter and the transverse lines coalescing into banded form as more open, drier, southern or eastern localities are reached. In the north and west of Scotland, and in some parts of Ireland, the prevailing form of *M. fluctuata* is dark grey in colour, with transverse lines, the central area often being without the slightest tendency for the transverse lines to assume a banded form; but as we come south the ground colour becomes paler in some localities, and at the same time the central band necessarily becomes more marked, until in the south of England and on many parts of the Continent, the ground colour has become white, and the central band partly disappears, often forming only a small dark blotch on the costa, or being entirely absent. Occasionally dark specimens and completely banded forms are captured, but these must be looked upon as simply reversions to the darker form. *M. montanata*, taking the Hebridean and Shetlandic forms as nearest to the type, shows a similar development, and the manner of suppression of the central area of the band shows most clearly in a long series from various localities. The special development relative to *M. rubiginata* was also entered into; a comparison of the Lancashire and south coast forms of *M. galiata* was made, and the darker ground colour and central band of the northern form noted. *C. bilineata* has a dark ground colour and is crossed by dark transverse lines in the majority of Shetland specimens; Scotch specimens also tended to be dark in many localities; as we got farther east and south there was a greater tendency for both sexes to become golden, yet in many southern localities, and in some years more than others, a large percentage showed reversion, by developing a dark central band, more or less complete. These dark specimens in the south were nearly always females, and hence this threw a side-light on sexual dimorphism in this group. Mr. Tutt suggested that it was quite open to assume that the paler forms were older (although he did not think it possible), when the dark specimens would have to be considered as instances of progressive development, instead of, as he had done, looking upon the dark forms as older, and the gradual extinction of transverse lines and bands, and change of ground colour, as so many steps in the line of progressive development.

Dr. Buckell remarked on *M. ocellata*, *Coremia ferrugata*, *C. unidentaria*, *C. propugnata*, and *C. munitata*, whilst Messrs. Clark, Milton, and Battley took part in the discussion which followed; and a vote of thanks was accorded to Mr. Tutt for his paper. An interesting discussion also took place respecting the effect of the recent severe frost on aquatic coleoptera and fish. Mr. Milton stated that he had found large numbers of dead beetles in the shallow pools at Clapton; but in the deeper ponds they appeared to have survived. Several members had observed dead fish floating on ponds and lakes, the oxygen in the water having apparently become exhausted.—G. A. LEWCOCK and A. U. BATTLEY, *Hon Secretaries.*

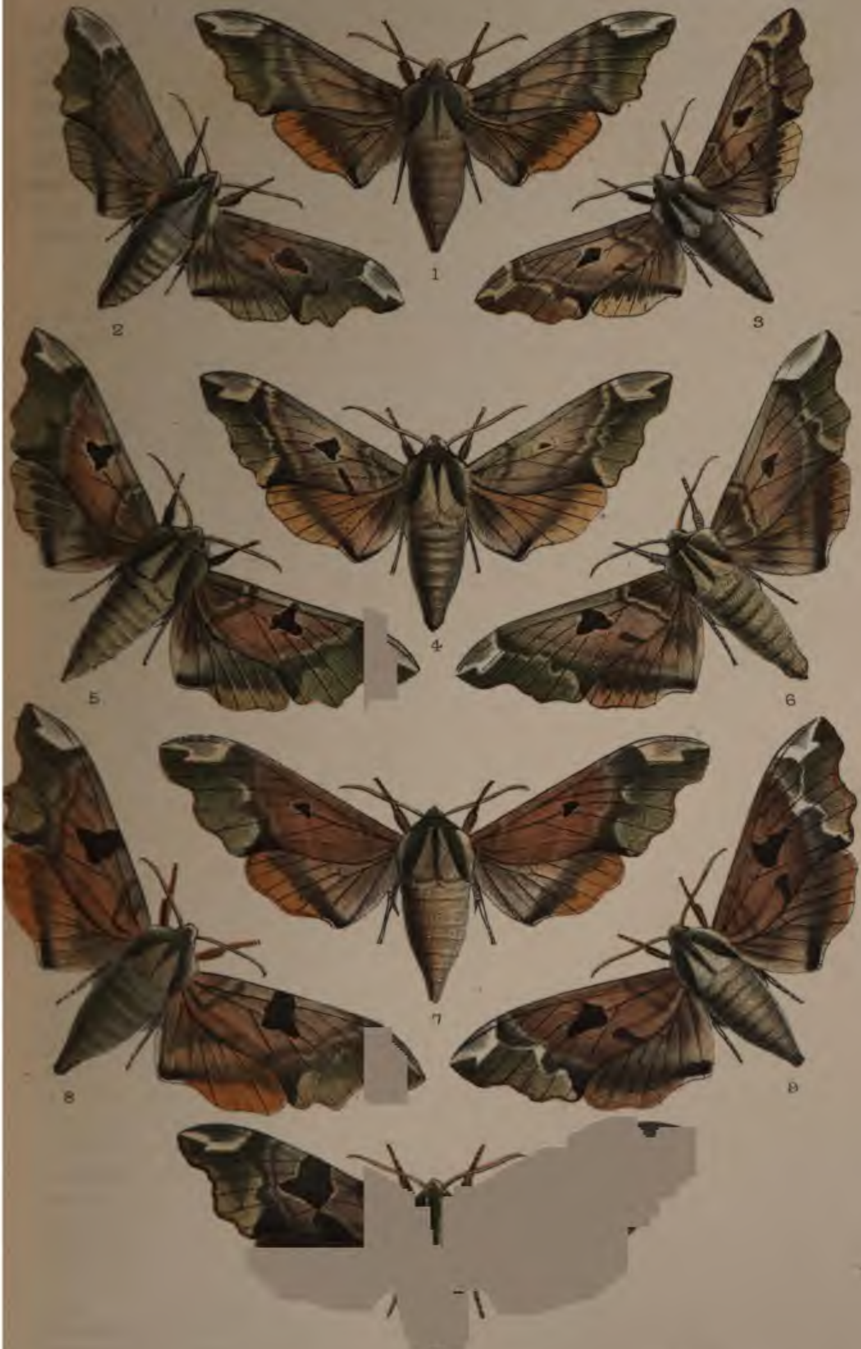
SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*January 22nd.*—Mr. South exhibited typical specimens of *Miana strigilis* and *M. fasciuncula*, and pointed out the following superficial differences between the type forms:—(1). That of colour; (2). the difference in stigmata, those of *fasciuncula* being often absent; (3). the more stumpy shape of *fasciuncula*; (4). the underside of *strigilis* grey, that of *fasciuncula* ochreous; (5). the presence of crested tufts on the abdominal segments in *strigilis*, and their apparent absence in *fasciuncula*. Mr. Tutt exhibited the specimens of *Miana* from Armagh, and others, for comparison. With regard to Mr. South's remarks, he pointed out (1). that the colour of the Irish specimens proved that it was entirely unreliable; (2). with regard to the stigmata the variation was equally marked in typical *strigilis* and *fasciuncula*; (3). that some of the *strigilis* exhibited were as stumpy as any *fasciuncula*, (4). that the crested dorsal and abdominal tufts, though perhaps a little more distinct in some *strigilis*, owing to the darker colour, were equally well developed in both (as the specimens exhibited proved); (5). that considering the great difference in coloration of typical *strigilis* and *fasciuncula* it was not surprising that the underside of the former was blackish-grey, and of the latter ochreous-grey. He also pointed out that Mr. Atmore and himself had spent some time in examining the long series in his cabinet, and that there was no single reliable point of distinction in structure and markings. Mr. Fenn expressed an opinion that all the Armagh specimens were dark *fasciuncula*, Mr. South that two were *strigilis* and the rest *fasciuncula*. Other members considered that three of the specimens were referable to *strigilis*, the others to *fasciuncula*. Mr. Tutt agreed with all these different views, as he thought the questionable specimens might (as he first stated) with equal propriety be called *strigilis* or *fasciuncula*. He also called attention to the fact that four descriptions of the larvæ of *strigilis* were in existence and all were different, and that reliable information was much needed. Mr. Fenn, whilst expressing an opinion of the general distinctness of *strigilis* and *fasciuncula*, said that it was absurd to rely on the dorsal abdominal tufts as a character by means of which to separate them, and suggested that these were developed in both species. His experience pointed to a difference in the time of flight; but Messrs. Tugwell and Tutt had found the species flying together until the middle of July. It was also remarked that the Armagh specimens in question were all taken on one date. Mr. South also exhibited an apparently extreme form of *strigilis*, which he thought might be a distinct species. Mr. Short exhibited specimens of a pale whitish var. of *Hepialus lupulinus*, females of *Pericallia syringaria*, and *Chrysophanus phlœas*; Mr. Tugwell an interesting and varied series of *Hepialus velleda*, from Perth; Mr. Billups the following Diptera:—*Sericomyia borealis*, *S. lappona*, *Chilosia œstracea*, *Arctophila mussitans*, *Eristalis intricarius*, *Volucella bombylans.* Mr. Tugwell then read a letter from Mr. Carrington, who is in the Riviera, after an attack of typhoid, and who referred in his letter to the daily appearance of *Colias*, *Vanessa cardui*, etc., the strange appearance of the nests of *Bombyx processionea*, and the ruthless slaughter of birds in the district. The election of Officers then took place:—Mr. W. H. Tugwell was elected President; Mr. J. Jenner Weir, F.L.S., F.E.S., Vice-President; Messrs. R. Adkin, F.E.S., C. Briggs, F.E.S., T. Billups, F.E.S., J. Carrington, F.L.S., C. Fenn, F.E.S., R. South, F.E.S., J. W. Tutt, F.E.S., Council; Messrs. Step, Barker, F.E.S., Rice, and West being re-elected as Treasurer, Secretary, Librarian, and Curator respectively.—Ed.

Lancashire and Cheshire Entomological Society.—*January 12th.*—At the Annual Meeting of this Society Mr. S. J. Capper, F.L.S., F.E.S., and Mr. F. N. Pierce were re-elected President and Secretary respectively, and the former gentleman delivered the annual address. After justifying the existence of Entomological Societies, he pointed out what a vast field of research the study of insect life opened up, and how necessary it was for certain men to become specialists if any real advancement was to be made. He also pointed out how much economic Entomology had done and was capable of doing in aid of agriculturists, and stated that the members were willing, as far as was in their power, to aid in giving information on such subjects.—F. N. Pierce, *Hon. Sec.* [It is interesting to read that 134 papers have been read by members during the year, fifty of which have been printed. It would be well if some of the London Societies could show such a record, as it is beyond doubt, that the extension of Entomological knowledge in this way, is the great *raison d'être* of our Societies.—Ed.]

NOTICES, REVIEWS, Etc.

The Lepidoptera of Suffolk. By E. N. Bloomfield, M.A., F.E.S.—The Rev. E. N. Bloomfield has compiled a most useful and interesting local list, and its completeness may be imagined when it is stated that, besides others, Messrs. C. G. Barrett, W. Warren, F. D. Wheeler, W. H. Harwood, T. and J. Brown, Dr. Hill, the Revs. Joseph Greene, A. H. Wratislaw, H. Williams, (the late) H. H. Crewe, C. T. Cruttwell, and the Hon. Beatrice de Grey have aided in giving information. The notes appended to many species are of great interest. The remarks on *Sphinx pinastri*, and those of the late Rev. H. H. Crewe, C. G. Barrett, and W. H. Harwood, found scattered throughout its pages, will attract more than passing attention, and give the *List* quite a character of its own. I note under the head of *Miana strigilis*, on the authority of the Rev. J. Greene:—"The larva is grassy green, very much pointed at each extremity, and feeds within the stems of grasses." Mr. Bloomfield has used great care in refusing all doubtful records, but of such, I should say that *Mamestra furva*, *Cheimatobia boreata*, *Euperia fulvago* and *Larentia olivata*, are certain to have occurred in Suffolk. They are all widely distributed, and all occur in *Kent*, *boreata* and *olivata* in abundance. Very few lepidopterists, I should think, will fail to write to Mr. Harwood of Colchester for a copy.—Ed.

Ent. Record. 1891. Pl. A.



W. Frohawk del. et lith. West, Newman, chromo.

Smerinthus tiliæ vars.

The Entomologist's Record
AND
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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

By J. W. TUTT, F.E.S.

(*Continued from page* 300.)

A SEASONALLY dimorphic species on which I have frequently experimented is *Tephrosia crepuscularia* (*lariciaria*). The March and April broods, from eggs laid in April, larvæ feeding throughout April, May, June, July, and very frequently August,[1] produce moths generally of a deep ochreous tint, varying somewhat in intensity according to the woods in which they are found (due probably to "natural selection") but still always more or less ochreous. The second brood, from eggs laid in April, larvæ feeding in May and June, produce pale whitish moths (no ochreous colour) in July.[2] I have repeatedly had a large brood, eggs all laid at one time, hatch simultaneously,—part of the larvæ feed up, pupate and emerge in eight or nine weeks producing the pale form,—whilst the remainder of the brood (under the same conditions) have fed slowly on, pupated in some fifteen or sixteen weeks, lain over as pupæ until March, and then produced the ochreous form. I have forced these autumnal pupæ, so as to obtain emergence throughout January, but they never produced anything except the ochreous (spring) brood. Now if Mr. Merrifield's conclusions previously referred to, were at all capable of generalisation, these forced specimens ought to be pale, but they never are, and I would suggest that the cause of difference is in the retarded larval conditions and the influence of heredity which makes one part of the brood grow slowly and pass the winter as pupæ before emergence. I have had a precisely similar experience with *Selenia illustraria*. Moths of the spring brood captured at large in Chattenden, have given me in the same brood (1) rapidly feeding larvæ which have emerged in July (as early as the 11th) as the summer form, and (2) slow feeding larvæ which have produced in April of the next year the dark winter form. I have also bred the dark winter form after an average temperature in my greenhouse of 48° for the winter, again proving that exposure to, or protection from cold has nothing to do with the coloration. But, whilst considering the seasonally dimorphic species *Selenia illustraria* and *S. illunaria*, I cannot help remembering how much their coloration must be due to protective resemblance, and as the spring broods of these species hang, wings downward, they can hardly be detected from the dry withered leaves on the plants they respectively frequent. Their environment is so different in the summer months, that it appears to me, quite sufficient to account for the difference in colour of the two broods.

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[1] I think *T. crepuscularia* is one of the slowest feeding species I ever reared.

[2] The larvæ from this emergence are just as slow in feeding up, and are rarely full-fed before October.

To show how close is the connection between heredity and the coloration of seasonal dimorphic forms, and the influence that the former undoubtedly has on the latter, I will quote some of Mr. Merrifield's conclusions with which I am in almost perfect accord. That gentleman writes with regard to "heredity" and "seasonal double-brooded species":— "(1). In such a species a young individual may have, and often has, a constitutional capacity for developing into either type, according to external circumstances. (2). It seems probable, that there is, from the beginning of the existence of the individual, a tendency, which may be very strong or very slight, to develop in the direction of one of the two types. (3). If there is no such innate tendency in an individual it can be imparted by external influences during the early part of its existence. (4). Where the tendency exists, it varies in strength in different individuals. In the case of some species, or some broods or individuals of some species, the tendency from the beginning is so strong that it cannot be overcome by any external influences. (5). In other cases the tendency can be overcome and converted into the opposite one, or turned more or less in the direction of it, by such influences. The *decision* as to the type to be assumed is come to before the termination of the growth of the larva, and this decision may be completely controlled in some cases by external influences applied before that period. For example, in 1887, by keeping the insect in all stages at a temperature of about 80°, I brought out four successive broods of *illunaria* in the ten months, all of the summer type.[1] (6). After larval growth is completed, no complete conversion of the one type into the other can be effected; it seems clear that such a conversion cannot be made as regards size,[2] and but slightly, if at all, as regards shape;[2] and it seems that it cannot be completely made as regards colour[2] or markings.[2] This incapability as to colour and markings certainly exists as respects *illustraria,* also as regards *A. levana* and *P. ajax* (Professor Weismann's experiments); and I gather that, in the cases published as to *P. rapæ*, *P. napi*, *P. pharos* and *P. interrogationis*, the butterflies from the iced summer pupæ presented some differences from the normal form proceeding from the winter pupæ" (*Trans. Ent. Soc. Lond.*, pp. 146, 147). Nothing could show better than these conclusions, how utterly impossible it is to leave heredity out of account when experimenting.

The influence of heredity in causing variation is again well recognised by Mr. Merrifield in the following:—"It will be seen that there is some individual variation *more particularly* in the pupæ exposed to the ordinary temperature, and therefore some of the colouring must be attributable to individual and presumably hereditary qualities" (pp. 137, 138); and the still further certainty of outside influences is shown in the failure to produce similar results from *tiliaria* (presumably not domesticated like the other species), "the results on the colouring, though tending in the same direction, were by no means so regular or so striking" (p. 138). "There is no doubt a strong pre-disposition, in an individual belonging to a double-brooded species, at some period of its development, towards one of the two different destinations, *i.e.* the emerging in the summer and with the summer colouring, or the lying over until the spring and then emerging in the spring colouring. The experiments lead me to think that in the species operated on by me the predisposition has become so decided in the larval stage[3] that no treatment of the pupa can afterwards entirely alter it, but, that in the early larval stage, treatment can—I do not say in all cases—either give the required predisposition, or, where it exists naturally, can completely reverse it" (pp. 142, 143). Here my experience with larvæ in unison with Mr. Merrifield's. All my notes and observations on the matter, satisfy me that the larval stage is the one which is extremely sensitive to external influences."

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[1] By bringing out four broods in one summer at a high temperature, there was delay in larval stage.

[2] I go further, and suggest not at all in either direction as most probable.

[3] I feel satisfied that this is the stage which is affected by external circumstances

Closely connected with heredity is the question of dark forms being brought about either by reversion or progressive development. Of the "Coalescence of dark markings," Mr. Cockerell writes :—" *Argynnis bellona* var. *fasciata*. The zigzag band fused with the outward of the inner markings, forming a white band (Maynard). *Chrysophanus hypophlæas* var. *fasciatus*, Strecker. *C. phlæas* var. *fasciatus*, *Entom.* xi., 25, with fig. (W. P. Weston). *Acronycta tridens* var. *virga* (*fasciata*), with marginal band, *Entom.* xi., 24. In these cases the dark markings have coalesced to form bands, such as are normal with other species, and it is hard to consider them entirely as cases of disease. Whatever may be their nature, I think there can be no doubt that they point to the way in which bands were originally acquired in banded species, and very possibly by careful breeding from banded aberrations such as these, a two-banded race might be formed" (*Entom.* xxii., p. 99). I do not for an instant imagine these to be cases of disease, but a matter of progressive development brought about by "natural selection." Many cases occur to me. *Argynnis adippe* var. *cleodoxa*. If the silvery markings have originated in the metamorphosis of some white pigment, var. *cleodoxa* must be a decided case of progression, for the original white, represented by the silvery spots, has here become reduced to a minimum, its place being supplied by fulvous. I have a fine series of varieties of undersides of this species, in which the intermediate forms between a remarkably silvery under surface, and total absence of silver spots, are represented. *Argynnis euphrosyne* and *Melitæa athalia* frequently assume a more or less banded form. *Syrichthus alveolus* often has the pale spots reduced to a minimum, thus closely resembling some of the allied south European species; *Lycæna agestis* and its var. *artaxerxes*, vary much in the quantity of orange spotting round the wing; *Hepialus humuli* males from Shetland become ochreous like the females; ill-developed spots in *Zygæna;* banded form of *Eulepia cribrum* (if this is not indeed a true melanism); dark banded *Odontopera bidentata*, *Crocallis elinguaria*, some of the *Ephyras*, *Acidalia bisetata* (outer margin), *Acidalia aversata* (banded form), *Lomaspilis marginata*, *Lobophora lobulata*, *Larentia cæsiata*, *Scotosia certata*, *S. undulata*, *Anaitis plagiata*, *Carsia imbutata*, *Eubolia lineolata*; most of the genus

Tæniocampa, etc., of all of which species I possess banded specimens,—all these I look upon as cases of progressive development towards a banded form, brought about or strongly aided by "natural selection"—rather than cases of heredity, disease, or reversion. Dark vars. of *Fidonia atomaria* and *Strenia clathrata* I look upon more in the light of true melanisms.

I have given several cases of "progressive development" tending to produce more or less partial melanism, but I am quite aware that it is possible to follow out these cases in the opposite direction to that which I have done, and look on them as cases of reversion. To me, no family of moths shows such ample proof of a tendency to become melanic by reversion as our so-called "Carpet" moths, comprising the Geometrid genera—*Melanthia*, *Melanippe*, *Coremia*, *Camptogramma*, and the allied *Larentia* and *Emmelesia*. I consider the most highly developed forms of these genera to be those specimens which are practically unicolorous, white, buff, or golden, with an entire (or almost entire) absence of transverse bands. I look on the least specialised forms as those which are dark in colour, covered with dark transverse wavy lines, with but rare tendency to banded form. I will take a few specimens as types of the whole group. *Melanippe hastata* var. *hastulata* (?), found in Scotland and the Hebrides, has the broad black transverse bands broken up into narrower bands and finer transverse lines. *Melanthia rubiginata*, the type in the southern districts of Britain, has only faint traces of dark central and marginal bands: as we get further west and north, the complete central-banded form (var. *virgata*) becomes typical; in certain parts of Ireland and Scotland no other form appears to be known; in the Trossachs and other West Scotland districts, the banded form is partly replaced by an unicolorous blackish form (var. *plumbata*) with transverse lines. *Melanthia albicillata* occasionally throws a form (var. *suffusa*) parallel to *rubiginata* var. *plumbata*. *Melanippe tristata* varies locally, in some districts the whole area of the wing is covered with transverse lines, in others the central area is very distinctly banded. *M. sociata*, a distinctly banded species on a white ground, in the south, exists in the Hebrides as a species with the transverse lines on a dark ground. *M. montanata*, occasionally almost pure white, frequently has the central band only represented by two darker external transverse lines, becomes more completely banded normally as we go north and west, until, in the Shetlands, the ground colour becomes greyish ochreous and the wings frequently crossed by transverse lines. *M. galiata*, a distinctly white species with a dark central band (frequently pale transversely in the upper part), becomes dark grey in ground colour, and has a very much blacker band in Lancashire. *M. fluctuata*, in its highest developed forms pure white (var. *immaculata*), then with a small costal spot, becomes as we travel north and west almost uniformly grey in ground colour, with the band becoming more or less complete, until, in certain parts of Scotland, the ground colour becomes greyish-black, and the central band in many specimens becomes more or less merged into transverse lines crossing the whole of the anterior wings. *Camptogramma bilineata*, in its highest developed forms, in both sexes, almost unicolorous golden yellow, transversely lined with yellowish colour in both sexes, becomes frequently faintly lined with black near costa, which develops into a more or less complete band in some (generally female) specimens, the black band becoming more typical in Scotland and affecting males equally with females, until we find that Hebridean specimens have the ground colour frequently greyish yellow with a distinct black central band, the other parts of the wing also finely lined transversely. These, I think, will offer sufficient examples for my purpose.

As I have previously stated, there seems to be but little doubt that, when the country was covered with forests, etc., the general condition of the atmosphere was more humid than at the present time, and I have before pointed out how, as Dr. Chapman has stated, in the northern and western parts of the British Islands, rocks, tree-trunks, etc., are made permanently darker by rain. Now, the species of moths to which I have just referred, all sit with their wings fully expanded, so that the whole surface of the wing must be taken into account in studying the effect of "natural selection" on the group. They rest on leaves, trunks, fences, and similar situations in the south, and hence their colour assimilates in some measure to their respective resting-places; but, in the more exposed localities in the north, they settle frequently on the bare rocks. In moist and exposed situations under such conditions, then, we should look for an approximation towards the original forms in the species, and in such, we find but few banded specimens, the prevailing forms being of a dark ground colour crossed with transverse wavy lines. That we get a gradual increase of the banded form as we come from the west and north of the British Islands, appears to be convincing proof of the theory that bands are formed by the union of transverse lines in certain parts of the wing, coupled with the suppression of the transverse lines in the other parts, in the same way that the lines forming a central band are frequently suppressed on the inner margin, leaving only a dark costal patch. Now, if we look on the pale forms, at present typical with us, as the type, there is no doubt that the dark forms must be looked upon as reversions, and, on the contrary, if, as I assume, these dark forms have really never been actually modified, but represent the original form, then we must look on the banded forms, those with a costal patch, and forms without dark markings, as all steps in one gradual line of development, of which the latter are the higher forms. I believe at any rate, that it is impossible to separate melanisms due to reversion, from melanisms due apparently to development, as some instances may simply be the exact converse of others.

Heredity was one of the points which I suggested should not be overlooked in considering the production of melanism, but there is yet another cause of melanism that should be mentioned, and that is disease. There is no doubt that disease, especially disease brought about by continued interbreeding and the consequent gradual weakening of the race, does produce melanism in certain species. In the *Entomologist's Record*, vol. i., pp. 236, 237, I have just touched on the subject, and instanced how often crippled specimens, the result probably of diseased or weak larvæ, are darkened in colour, and specially instanced a large brood of inbred *Arctia menthastri* which were very variable in markings, and which all showed a melanic tendency. But attention has only just been drawn to the subject, and there is no doubt that more facts will soon be forthcoming. I have, at the present moment, in my possession a very long and varied series of *Cuspidia alni* bred by Dr. Chapman. This species, he informs me, he has bred and inbred for some years. The specimens were all at first quite normal in colour and markings, and whilst this was so, the progeny were interbred without difficulty. This year, the brood produced scarcely any typically coloured specimens; almost all were varieties, and much darker (some very much) than usual, but the moths failed to produce fertile ova, and the brood died out. Here, it seems almost certain, that the darkening was due to disease, brought about by "in-and-in breeding." I find also a remark by Mr. J. C. Warburg which runs as follows:—"A batch of larvæ of *Vanessa antiopa* which were under-fed, produced seven *dark* specimens of small size, about two inches in expanse" (*in litt.*); whilst of *Melitæa cinxia* he writes:—"A few small bred specimens have the black markings (especially beneath) more pronounced." Dr. Buchanan White (*Ent. Mo. Mag.*, vol. xiii., p. 149) writes:—"Frequently, melanochroic (and more frequently melanic) individuals are of smaller size than the typical form." The influence that this (disease) must undoubtedly have, in experiments which we carry out by breeding insects, must not be lost sight of altogether in the inferences and deductions we may make from the results apparently produced.

In connection with disease as a cause of partial melanism, Mr. Cockerell, writing under the title of "Suppression of light markings," says:—"*Papilio asterias* var. *asteroides*, Reak., *Limenitis arthemis* dimorphic forms *lamina*, Fab. and *proserpina*, Edw., *Apatura iris* var. *iole*, Schiff., Newman's *British Butterflies*, 72, *Mamestra persicariæ* var. *unicolor*, Stdgr. These must, I suppose, be regarded as cases of partial melanism; but Mr. H. Goss (*Entom.* xi., 73), in describing a dark variety of *Chelonia villica* from Brighton, mentions that several dozen larvæ from the same place produced the type, and suggests further that the aberration was due to a diseased condition in the larva. Now this variety exhibited coalescence of the dark markings and suppression of the light ones, which further, was more complete on the right than on the left side, so it seems certain that it had nothing in relation with such cases of melanism as *Pieris napi* var. *bryoniæ*. I am therefore inclined to separate all dark forms into two groups:—(1). True melanisms. (2). Cases of coalescence of markings due to disease. What the precise nature of the disease may be, and which forms precisely are to be classed in either group, is for future investigations to decide" (*Entomologist*, vol. xxii., pp. 98, 99). I have in my cabinet three specimens of *Vanessa urticæ*, bred by my friend Mr. H. Page, which were supposed to have been crowded as larvæ, which produced among other slightly aberrant forms, two specimens with very suffused, and one with perfectly black hindwings. Here there seems to be some distinct connection between cause and effect.

I have previously referred to the possibility of Mr. Merrifield's results having been influenced, in the case of *Selenia illustraria*, by a tendency to disease (possibly through interbreeding). How probable this is, may be seen by carefully looking at the figures of his specimens (*Trans. Ent. Soc. Lond.*, 1890, Pl. V.), where figs. 3, 6, 11 and 12 are more or less what would be vulgarly called cripples, whilst the asymmetry in some of the other specimens points exactly to the same conclusion. When one reads such as the following:—"It is probably owing to the greater exposure that they have a less vigorous appearance, and include a large proportion of cripples" (p. 137), when speaking of the dark and much-spotted moths; and again "The whole of the fourteen emerged in good condition, showing that I had fallen on a healthy brood; and showing also that it was a naturally dark-coloured one, and therefore, perhaps, not so well adapted to show any darkening of colour as a lighter-coloured set would have been" (p. 139), thus unconsciously linking a certain (dark) colour with health and *vice versâ*, and when one reads as results:—"Thirty-six pupæ, twelve emerged, of which seven were cripples;" "sixty-three larvæ, eighteen pupæ, four emerged, of which two were cripples;" "twenty-six pupæ, thirteen emerged, of which four were cripples, etc.," (p. 142), I think some consideration should be given to the facts.

(*To be continued.*)

SCIENTIFIC NOTES.

NOTES ON THE GENUS HOMŒOSOMA.—An error in the "Practical Hints" for September, has been the means of directing my attention to a group, which I have in some way neglected. As some of our best collectors seem to be in doubt as to the respective species, I think that perhaps it may be advisable to make a note on the subject.

Homœosoma nimbella. This species, perhaps the most common of the genus, feeds in the larval state on many Composite plants. Its food generally is *Matricaria*, but Mr. Eustace Bankes writes:—"It is by no means confined to that plant, but is equally found on several other composite flowers, *Anthemis cotula*, *Solidago virgaurœa*, etc. I am almost certain that it is as often to be found on ragwort as on anything else. It is not my experience either, that the larva feeds singly; there is only room for one in a single flower, but several are often found in a single plant. I collected, this autumn, a good bunch of ragwort heads containing larvæ which I fully expect will prove to be *nimbella*." Herr Eppelsheim writes:—"The larva of *H. nimbella* bores into a single flower, in which it remains concealed; its presence, however, being often indicated by the florets which it dislodges" (*Stett. Ent. Zeit.*, 1890, p. 53).

H. saxicola. This species, which feeds on flower heads of chamomile (Vaughan), and flower seeds of several species of *Compositæ* (White), is considered a var. of *H. nimbella* by Mons. Ragonot (*E. M. M.* xxii., 26), who says that "*saxicola* is larger, with the fore-wings more distinctly white on the costa, and the rest of the wing of a pure ochre, not at all powdered with black scales as in the type of *nimbella*. He also further suggests that "*saxicola* should be retained to distinguish the English variety of *nimbella*," inferring apparently, that all our *nimbella* are *saxicola*, which of course they are not.

H. senecionis. Larvæ of this species were first found by Mr. Vaughan, mining in the stems of ragwort (*Senecio*). Mons. Ragonot (*E. M. M.* xxii., 26) says:—"The larva feeds in a tubular gallery among the flowers of *Senecio jacobœa*." Mr. Eustace Bankes writes:—"I have lately had reason to work up what information I could about *senecionis* (having never met with it in nature), and I can answer for it that it feeds in seedheads both of ragwort and tansy.[1] Two friends of mine who obtain the larvæ in tansy heads in Scotland, find them scarce, which looks as if they are no more inclined to be gregarious than *nimbella*." Herr Eppelsheim writes:—"The larva of *H. cretacella* (*senecionis*) feeds in the heads of different species of *Senecio*, and draws several florets together with a web, the latter mixed with frass" (*Stett. Ent. Zeit.*, 1890, p. 53).

Here, then, we have two members of the genus *Homœosoma*—*nimbella* and *senecionis*—and probably a third—*saxicola*—feeding on ragwort. There are now two thistle-feeders, *binævella* and *nebulella*, to deal with.

H. binævella (*eluviella*). Mr. Barrett described the larva (*E. M. M.*, vol. xv., 180) as feeding in the heads of thistles. Mr. Eustace Bankes writes:—"To the best of my belief, *H. binævella* feeds only in thistle, and especially, though I daresay not exclusively, on *Carduus nutans* and *lanceolatus*."

H. nebulella. This species, about which perhaps less is known than any other species, is described as feeding in heads of thistles. Mr. C. G. Barrett, summarising the genus, says:—"*Senecionis* is recognisable at once by its broad fore-wings, and *nimbella* by its narrow ones. *Eluviella* (*binævella*) has a white costal stripe. *Nebulella* is rather larger, its costa is not white, but is decidedly more rounded, and the fainter dots of the first line are more nearly parallel to the others. Although the distinctions seem trifling, they are quite easily recognisable when you see the insects alive, or a good series when preserved" (*in litt.*).

H. sinuella. This distinct little species feeds in the root stalks of *Plantago lanceolatus*. Superficially, it varies excessively both in colour and markings. Structurally, "it varies somewhat in the neuration" (Ragonot, *E. M. M.* xxii., 26).—J. W. TUTT, *December*, 1890.

AMERICAN PARASITES OF BRITISH SPECIES OF LEPIDOPTERA.—*Insect Life*, vol. iii., contains an interesting list of Hymenoptera bred in the U.S. Department of Agriculture, which adds greatly to the knowledge of insect-parasitism. The November number, just to hand, has mention of the following parasites of British species of Lepidoptera:—*Ichneumon rufiventris*, Brullé, from *Vanessa cardui*. *Phæogenes ater*, Cr., from *Sesia tipuliformis*. *Herpestomus plutellæ*, Ashm., from *Plutella cruciferarum*. *Hemiteles laticinctus*, Riley MS., from *Leucania unipuncta*. *Stibentes pettitii*, Cr., from *Leucania unipuncta*. *Pezomachus minimus*, Walsh, from *Leucania unipuncta*. *Ophion purgatus*, Say, from *Hadena trifolii*. *Mesochorus scitulus*, Cr., from *Leucania unipuncta*. *Limneria oxylus*, Cr., from *Leucania unipuncta*. *L.*

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[1] Mr. Reid, of Pitcaple, Aberdeen, informs me that ragwort is usually called tansy in Scotland.—ED

tibiator, Cr., from *Plutella cruciferarum*. These examples illustrate the fact that the parasite is often of more restricted range than any particular host; but on p. 177 of the same number we have an opposite instance, that of *Opheltes glaucopterus*, L., an Ophionid found both in Europe and America, but infesting species of *Cimbex* which are peculiar to one continent.—T. D. A. Cockerell. *January*, 1891.

Fecundation before Hybernation.—A friend inquired of me a short time ago if I ever obtained ova of *Xylina petrificata* or *X. semibrunnea* in the spring. The question was rather puzzling. In the first place I was not aware that the last named insect hybernated (I have never taken or seen a specimen in the spring, neither does Newman say that it hybernates); secondly, though *petrificata* hybernates freely, I was uncertain whether the females deposited ova in the autumn, or after hybernation. I am inclined to think, now, that this is done in the autumn occasionally, as one evening last October, I took a female at ivy, and through an oversight it remained in the box it was taken in throughout the following day. On opening the box to take out the insect for killing, I found it had laid a quantity of ova, and was most agreeably surprised, the more so, as I was under the impression until then, that the eggs were not laid until spring. I may say, that I have never got ova after hybernation, though I have frequently kept specimens for that purpose. I should feel greatly obliged for information respecting these two insects, from any entomologist who may have bred them from ova, or who knows their earlier stages.—J. Mason, Clevedon Court Lodge. *January*, 1891.

Aneurism.—This occurs equally in a state of nature as when breeding insects. Nine out of twelve bred *Nonagria sparganii* were affected thus, and numerous were the imagos captured among the foodplants unable to fly from the same cause.—Sydney Webb, Dover. *January*, 1891.

Sudden development of the wings of Lepidoptera.—The *Chesias spartiata* incident related by Mrs. Bazett (*ante*, p. 237) is certainly strange, but I have had the same experience on two occasions, the first with *Cerura vinula*, and the second with *Notodonta dromedarius*. If I remember rightly, *C. spartiata* buries itself at a considerable depth to undergo its transformation from larva to pupa. This may have had something to do with it, especially if the pupa had been disturbed and laid on the surface. Perhaps Mrs. Bazett can tell us this. The eccentricities of some of these deep-burying larvæ are wonderful, and how they return to the surface is surprising. *Pelurga chenopodiata* and *Nyssia hispidaria* are examples, especially the latter, which will go down at least twelve inches if the soil be loose.—C. Fenn, Eversden House, Lee. *January*, 1891.

VARIATION.

Variation of Smerinthus tiliæ (with Coloured Plate).

I think it probable that a description of some of the varieties of this species will prove interesting to the readers of the *Entomologist's Record*. If we look at our three species of *Smerinthus*, we note, that *S. populi* has a more or less developed band passing transversely across the centre of the anterior wings; *S. ocellatus* has a fairly developed dark blotch on the costa of the anterior wings, followed by a smaller blotch on the inner margin, these two blotches undoubtedly showing the origin of a central band in the genus; whilst in *S. tiliæ*, the central band is always dark on a pale ground, and hence stands out conspicuously. Perhaps the most common form of the band consists of a large costal blotch and a large blotch on the inner margin just united at the centre of the wing, as in Plate A, fig. 10. Sometimes this band, however, is quite complete, and occasionally, entirely absent, as Plate A, fig. 1, will show. The most interesting feature with regard to this, is the occasional asymmetrical character of the band as in figs. 2, 4 and 6; and figs. 3, 5, 7, 8 and 9, although all showing some abnormal condition of the band, are perfectly symmetrical. A structural point to which I would also draw attention is the variation in the outline of the anterior wings. This species always appears to unite the sinuous outline of *S. populi* with the centrally concave outline of *S. ocellatus*, the latter feature being generally strongly developed; but in the specimens figured it will be noticed that figs. 1 and 4 have this character reduced to a minimum, whilst fig. 8 has it very strongly developed. There is a considerable amount of variation, also, in the width of the double transverse basal line, compare figs. 1 and 3; that of fig. 7 is, however, practically obsolete, and fig. 10 also shows some variation in direction. In the basal space between this line and the thorax, there is also considerable difference, compare figs. 6 and 8. Of the variable character of the transverse line outside the central band, figs. 9, 8, 6, 3, 2 and 1 show especially, although no two are alike, and fig. 6 exhibits a most abnormal, asymmetrical shape of the pale apical blotches. Careful comparison shows that there is some variation in the shape of the hind margins of the posterior wings.

With regard to variation in colour it would be next to impossible to make any intelligible remarks without the plate. Fig. 1, var. *obsoleta*, is of a delicate fawn colour, with the basal area and transverse lines slightly darker, the central area having the faintest tinge of pink, without the trace of a transverse band; the extreme outer area is strongly tinged with green. Hind wings orange-coloured with a brown dark central band, united to the dark scales at the base. Fig. 2. The left hand anterior wing is identical with var. *obsoleta*, as also is the right hand, except that it has central and inner marginal blotches, as traces of the original band. The ground colour of the hind wings is much like that of the fore wings, the dark band also ill-developed. Fig. 3, var. *bipunctata*, has the ground colour slightly more tinged with pink than figs. 1 and 2, and the outer margin rather grey; the transverse band is represented by a central spot and a smaller one on inner margin; hind wings tinged with yellowish, band not very distinct. Fig. 4. Another asymmetrical specimen with the ground colour of anterior wings much as in fig. 3, but the outer edge with more green; the left wing with two spots as in *bipunctata*, the right with one as in *centripuncta*. The bases of the posterior wings are rather darkly scaled, otherwise like those of fig. 1. Fig. 5, with the ground colour of the central area redder than any of the preceding, and with the outer area greener. The spot is intermediate in development between the costal one in fig. 8 and the central one in fig. 7, and is not quite symmetrical, reaching fully to the costa on the right, but not quite on the left; hind wings dark greyish fuscous from the band to the base, the outer margin tinged with reddish. Fig. 6. Another asymmetrical specimen of the same colour, and showing development exactly on the same lines as fig. 4; the shape of the pale, apical blotch on the right-hand fore wing is very striking. The hind wings also as in fig. 4, but a little darker. Fig. 7, var. *centripuncta.* The whole of the central and basal areas, deep reddish, the outer, normal, greenish-olive, one small central spot is the only trace of the transverse band; the hind wings yellowish, with the band rather ill-developed. Fig. 8, var. *costipuncta.* Almost identical in coloration with fig. 7, but the transverse band represented by a large costal blotch. Fig. 9. Basal and central area red, as in figs. 7 and 8, but of a more purplish tinge, the paler outer parts of the wing well developed, outer area greenish-olive; central band, two spots, one central, and one on inner margin, better developed than in fig. 3, var. *bipunctata*; hind wings almost identical with those of fig. 5. Fig. 10, var. *suffusa.* Anterior wings dark olive-green, with central area tinged with pink, crossed by a deep olive-green band, almost joined at one point on the right-hand wing; hind wings, except on margin bordering the abdomen where the colour is pale, deep fuscous black.—J. A. Clark, The Broadway, London Fields. *February*, 1891.

Notes on some Varieties of South French Lepidoptera.—The description of a few aberrant forms of Lepidoptera, which I have met with during the last few years in Cannes and its neighbourhood, may be of interest to your readers. All the descriptions are from actual specimens in my possession. *Papilio machaon.*—A slight aberration, of which I have several examples, has an orange spot in the first yellow lunule (and in one specimen in the second as well) on the costa of the hindwings. This is also present beneath. *Leucophasia sinapis.*—The cloudy markings beneath are pink instead of grey in one specimen. *Lycæna icarus.*—This species is, on the average, larger in the Riviera than in Britain, the males not quite so brown beneath. Aberrations are fairly common, generally in the ♀ (I have twelve ♀ abs. to two ♂). The commonest is that in which the last spot of the central line of the hindwings beneath, joins or nearly joins the lower basal spot, forming a dash. In many specimens, other spots are elongated toward the base of the wing. In one, the third spot joins the discoidal lunule. These varieties have not always the markings of the wings of both sides symmetrical. Many females are brilliantly shot with blue above. Ab. *icarinus.*—This has the two basal spots on the forewings beneath, missing. Intermediate forms have only one spot (either the upper or lower) missing. *Lycæna corydon.*—An aberration occurs with two spots run together, as in many of *icarus.* Ab. ♀ *semibrunnea*, Mill. (?). A very pretty and uncommon variety, differing from *corydon* ♀ in the following way:—Upper side: forewings with distinct black discoidal lunule, surrounded by light bluish scales, with which the lower part of the forewings and the disc of the hindwings are powdered. Hind wings with the eyes clearly marked, and with *distinct lunules of powdery blue* before the row of eyes. Discoidal lunule small and inconspicuous, faintly surrounded with lighter. The upper side resembles *adonis* more than *corydon*, especially in the colour of the blue. The underneath has the coarser markings and coloration of *corydon.* I may here allude to the French ab. ♀ *syngrapha*, Kef., though I have never found it on the Riviera. The whole of the upper wings, as far as the row of eyes, is nearly as thickly scaled as in the typical male, with almost the same tinge of blue. The discoidal spot of the forewings above very distinct, the orange spots small, and the smoky bars on the fringes broad. *Lycæna adonis.*—Ab. ♀ *ceronus*, Esp. One specimen having the upper side of all the wings covered with brilliant violet blue, except on the costa. Orange spots of hindwings very bright. *Lycæna argiolus.*—♀ specimens vary slightly in colour. *Vanessa antiopa.*—A batch of larvæ which were underfed produced seven *dark* specimens of small size, the one which I have expands two inches instead of three. *Vanessa io.*—Two similar specimens, probably produced in the same manner. *Melitæa cinxia.*—A few small bred specimens have the black markings (especially beneath) more pronounced. *Epinephele janira.*—A ♂, with irregular lighter blotches on the forewings, one streak on the left and two on the right, not symmetrical. *Arctia villica.*—This species in the South of France is very variable, no two specimens being alike, and the two sides often unsymmetrical. The most notable variation occurring is the enlargement of the spots towards one another—in one specimen they nearly all join. Some specimens have the spots of a yellow colour (ab. *angelica*, Bdv.) *Deiopeia pulchella* varies much in the size and intensity of the red and black dots. *Eulepia grammica.*—Male specimens vary in the distinctness of the black lines on the forewings, and in the breadth of the black border of the hindwings. In one specimen the black encroaches on the greater portion of the hindwings. *Saturnia pavonia* (*carpini*) is larger, brighter, and more thickly scaled than any English specimens. This species, as well as the closely related *S. pyri*, often remains two years in the pupal state. *Drepana hamula.*—This species is represented in South France by the very different var (?) *uncinula* (Bkh.). A description of the latter may be of interest. *Uncinula* is considerably larger than *hamula*, expanding about seven-eighths of an inch in the ♂, and one and one-eighth of an inch in the ♀. The forewings are of a richer and darker brown. The two black spots are usually fairly distinct. There is a distinct black dash at the tip of the wing with a whitish mark just over it. The hindwings are lighter, yellow towards the costa. All the lines are rather less distinct than in *hamula*; the second on the forewings is rounded instead of angulated. There is a sort of purplish bloom on the costa of the forewings. Larva very variable in colour, greenish when full grown; on *Quercus ilex*. Not common.—J. C. WARBURG, 8, Porchester Terrace, W.

VARIATION AND FOOD (?).—The *Semasia urticana* from Forres are very pretty forms, much paler than our southern examples. In the Sevenoaks district, where the *Vaccinium* grows freely, we get a variety of lovely red and deep brown marked specimens. These do not seem to occur except where the bilberry grows. Is it not a peculiar coincidence that many insects, when feeding on *Vaccinium*, are affected in size and colour? *Cidaria russata*, *Hypsipetes elutata*, and this species are those I can best recollect at the present moment.—C. FENN, Lee. *Jan.*, 1891.

ZYGÆNA FILIPENDULÆ VARS.—Mr. Baxter's *Z. filipendulæ* (*ante*, p. 240) is a most striking variety. I have bred a good many *Z. filipendulæ*, in order to get the yellow var., but have never seen any tendency to variation in the direction of this dark specimen. I should be interested to know whether the yellow var. occurs in other localities. I have taken it at Winchester and Cambridge, but I believe that it is very local; and I have never seen it here, although I am told that it has occurred. In many places in this neighbourhood the species is very common. The yellow var. is conspicuously yellow when on the wing, and would probably be noticed.—N. M. RICHARDSON, Monte Video, near Weymouth. *October 14th*, 1890.

One scarcely knows what to call the specimens of *Zygæna* without red spots; they are not unicolorous, and certainly not melanic. The following are all I know of, and they are worthy of record in addition. *Z. trifolii*—Robertson Coll., Liverpool; Dr. Mason's, Burton-on-Trent *trifolii* or *filipendulæ*; J. B. Hodgkinson (Preston) has one, the latter mentioned another to me, possibly Mr. Baxter's *filipendulæ*, and, lastly, there is Mr. Goss's specimen. *Filipendulæ* v. *citrinus* is a recurrent var. both at Cambridge and Winchester, but only a very occasional visitor elsewhere. At Hartlepool it has appeared three times, but only single specimens. Why this insect should never vary in the least at one locality, and run to different named forms and splashed vars. at another, whilst the facies of local broods equally preserve their identity, is "one of those things that no fellow can understand." I have bred thousands, and never had a black or yellow one, only gradations of pink in the hind wings, and coalescing spots.—SYDNEY WEBB, Dover. *Oct.*, 1890.

The black and yellow *Z. filipendulæ* are both well worth seeing. The species is very common along the coast south of Aberdeen, but I never heard of a yellow or black var. having been got.—W. REID, Pitcaple. *October 20th*, 1890.

LYCÆNA AGESTIS var. SALMACIS.—This var. is taken on dry banks at Richmond, Yorks. According to my experience *salmacis* is about a fortnight later than *agestis*, but this may be only a coincidence.—WM. MILBURN, Darlington. *January*, 1891.

NOTES ON COLLECTING, Etc.

COLLECTIONS.—In the *Record*, p. 99, I had a few words to say about the much maligned "collector"; I would now say a few words about "collections."

Collections are "means," not "ends." This embodies the whole *raison d'être* of forming collections, and determines whether the making of the collection is of advantage or not to the maker.

To the uneducated man, the collection, setting, and correct arrangement of specimens when obtained, is an advantage to the maker, and such a one needs no defending, even though he go no further.

The mere capturing of specimens for pictures, etc., can readily be justified, when carried out by men, who would remain ignorant of the beauties of nature, unless stimulated by something of this kind.

To the educated man, the making of collections, with no other object in view, is not justifiable; to capture large numbers of specimens to gratify a feeling of possession is altogether insufficient grounds for forming a collection, and where this is the "end," it is of no use to the collector.

To the educated man again, a collection should be a record of observations:—(1). Of observations made in the field by the collector himself. (2). Of observations leading to comparisons in species which he has obtained from others. Nothing, I think, is more disappointing than to find a comparatively well-educated man with no ideas of comparison, no appreciation of the development of species as exhibited by variable forms, no wish to have specimens of a species from an outlying locality, because he can get the species himself and his series is full, no idea of the habits, life-histories, etc., of his specimens, to whom the only value of the collection is to have six or more fine, well-set specimens, obtained from the same locality, without data, without making any impression on the collector's mind beyond a passing "What perfect specimens! What perfect fringes! How well set!" In an uneducated man, a "collection" formed in this way is pardonable, in an educated man, it is unjustifiable.

There is a stage in all collectors' lives, when the love of possession and the beauty of the collection is perhaps the ruling passion. When a man has been collecting some six or eight years and finds that he has no more wish to know the how, when, where, and why of his specimens than he did at first, he may take it as a matter of fact that his collection is doing him but little good. If he makes no observations, his collection is the "end" and not the "means," as it ought to be, to the "end."

If a man has but limited space,—say he can take six specimens of each species—instead of getting six specimens of the same species from the same locality, let him get a ♂ and ♀ of the species from three localities, then he will be getting material to make observations, and his collection will become a "means to an end."

Better still, if a man's space is limited, let him devote himself to one genus. There is more value to be got out of a close study of a single genus like *Agrotis* or *Scoparia*, than by a superficial attempt to collect the whole group. To the beginner, I would say most decidedly—get a knowledge of the whole group first; but I am suggesting the study of a group to one whose space and time is limited but who wishes to become a useful entomological student.

If our collectors will only ask and answer the question:—Is my collection an "end," or the "means to an end"? they will soon be able to tell whether their collecting is of use to them.—J. W. Tutt, Westcombe Hill, S.E.

Notes of the Season of 1890 (Lepidoptera).—*Clevedon.*—I have only taken one specimen of *Dasycampa rubiginea*, and one specimen of *Petasia cassinea* at rest on a twig evidently just emerged. *Pœcilocampa populi* appeared on the evening of November 12th, but I have seen no other specimens up to this date; it would appear, from this and previous observations, that there are two distinct periods of emergence of this insect in this locality. I tried sugaring on several evenings during the third week in November, but with no result, not a single insect, and I am afraid the severe frost and snow of last week will necessitate the placing of the sugaring tin on the shelf for the winter.—J. Mason, Clevedon Court Lodge, Somerset. *December*, 1890.

North Wilts.—On the whole, I do not think this has been a good season for Lepidoptera here. Sugar, as in other places, seems to have been productive only at certain times. During the latter end of June and beginning of July, I obtained the following:—*Aplecta nebulosa*, *Xylophasia polyodon*, *X. sublustris*, *Agrotis corticea* and *Mania typica*; *X. polyodon* as usual being a perfect pest. August, however, proved an entirely blank month as regards sugar, no species being taken but the very commonest. With the commencement of September, things began to improve, and many insects visited the patches, including *Hadena proteus*, *Anchocelis litura*, *A. pistacina* (in the utmost profusion, which, together with *Polia flavicincta*, has been one of the commonest moths this season) and other common things such as *Gonoptera libatrix*, *Phlogophora meticulosa* and *Amphipyra pyramidea*. Insects still continued coming throughout October, during which month I took the following:—*Orthosia macilenta*, *Cerastis vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Xanthia ferruginea*, *Agriopis aprilina* and *Xylina rhizolitha*: the only additional moth taken in November was one *Orthosia lota*. Compared with last year, the number of species is very meagre, although insects of some description or other have been fairly common. But by far the most productive method this season, in my experience, has been indoor light; among others I have taken the following:—*Cilix spinula*, *Nudaria mundana*, *Lithosia complanula*, *L. griseola*, *Arctia lubricipeda*, *A. menthastri*, *Liparis auriflua*, *Thyatira batis*, *Xylophasia sublustris*, *Abrostola urticæ*, *A. triplasia*, *Noctua rubi*, *N. plecta*, *N. umbrosa*, *Hydrœcia micacea*, *Selenia illunaria*, *Coremia propugnata*, *C. ferrugata*, *C. unidentata*, *Scotosia dubitata*, and *Cidaria miata* which has been one of the commonest Geometers this year. Ivy blossoms have produced absolutely nothing but one *S. satellitia* and one *Cidaria miata*, although the blossoms have been as fine as I have seen them. During the latter part of June and beginning of July, I beat for Geometræ, with some success, taking the following:—*Epione apiciaria*, *Metrocampa margaritaria*, *Iodis lactearia*, *Phorodesma bajularia*, *Asthena luteata*, *Timandra amataria*, *Larentia pectinitaria*, *Thera obeliscata*, *Cidaria pyraliata*, *C. dotata*, *Eubolia mensuraria* and *E. bipunctata*. The flowers of the common sage proved attractive to the genus *Plusia*. Since August, I have been pupæ-digging assiduously. Many have already emerged, including *Agriopis aprilina*, *Hadena proteus*, *Pœcilocampa populi*, two *Cidaria miata*, one at the roots of poplar, which I think is rather unusual. But perhaps the greatest surprise was to find two *Petasia cassinea* ♀ and ♂, the pupæ of which I had dug up under elm. *Cheimatobia brumata* has been exceedingly plentiful this autumn, several being found on each apple tree. This is a very poor country for Rhopalocera, scarcely any being found but the very commonest, the best place being the Marlborough Downs where I have taken five species of the genus Lycæna.—T. B. EDDRUP, Bremhill, Calne, Wilts.

Wye Valley (*below Builth*).—The end of the season here has been much more unproductive than even the earlier part. In fact, lepidoptera seemed to be scarcer than I ever remember. Sugar was a complete failure, I tried it repeatedly on what seemed to be most favourable nights, but caught simply nothing of the slightest value. I caught a few insects at light including *Xanthia silago*, several *Heliophobus popularis*, and a few *Pœcilocampa populi*. Of the Geometers, I took *Cidaria psittacata* and *C. miata*. I tried this season for the first time, to rear some larvæ. I gathered them off the oak in June, when they were fairly plentiful. I think the mistake I made was to overcrowd them, as a good many died, and, I expect the cannibals I had, finished a good many more; however, next year I hope to have profited by experience and to do better. I reared large numbers of *Cosmia trapezina*, *Scopelosoma satellitia*, *Tortrix viridana*, *Hybernia defoliaria* and *H. aurantiaria*, both males and wingless females. I found the caterpillars of the two last-named on hazel. I found larvæ singularly scarce all the end of the season, and shall be curious to see how next year will turn out, especially after the present Arctic weather. —JOHN WILLIAMS VAUGHAN, JUN., The Skreen, Radnorshire.

Grange-over-Sands.—The only thing here worthy of record has been *Pæcilocampa populi*, which first appeared on November 16th, when they were in fair numbers on the gas lamps, but since then, they have been few and far between. *Cheimatobia brumata* has been excessively common in the woods, etc.—GEORGE A. BOOTH, Grange-over-Sands. *January*, 1891.

Clevedon.—On October 15th, the wind shifted round from east to south-west, and there was quite a "rush" of insects to ivy bloom:—*Orthosia macilenta*, *O. lota*, *Scopelosoma satellitia*, *Xylina petrificata*, *X. semibrunnea*, *X. rhizolitha*, *Oporabia dilutata*, *Cerastis vaccinii*, *C. spadicea*, *Xanthia ferruginea*, *Miselia oxyacanthæ* and its var. *capucina*; all these, with the exception of the last three, putting in a first appearance on this evening, a full fortnight late I should say, and this one of the finest autumns I have experienced during the eleven years I have resided at Clevedon. *Sphinx convolvuli* is still an absentee, though I have taken it as late as the first week in November.—J. MASON, Clevedon. *October*, 1890.

Darlington.—I took at light last week, *Pæcilocampa populi*, *Petasia cassinea*, *Dasypolia templi*, *Cidaria miata* and *Oporabia dilutata.*—W. MILBURN. *October 27th*, 1890.

ABUNDANCE OF SETINA IRRORELLA IN THE ISLE OF WIGHT.—The above very generally distributed species is well known from Newman's *British Moths* and other sources to be specially abundant on the Freshwater Cliffs, but my own experience, when working in that neighbourhood, showed me that unless its habits are studied, as with almost every other species, it is not much "in evidence." Saving for a stray specimen occasionally found at rest late in the evening when sugaring, or kicked up by chance during the day I have never but on one occasion seen this species in any plenty excepting when I have suited my own habits to that of my desired quarry. The one occasion I refer to was a particularly mild night early in July, when just at dusk, *irrorella* was flying in great numbers but confined to a very limited area. It would have been possible although dangerous, owing to the nearness of its flight to the edge of the cliffs, to have netted considerable numbers. However, wishing to secure a long series in hopes of meeting with the rarer variety (var. *signata*), I decided to make a special attempt, and, finding a very precipitous piece of rough ground covered with a very rank growth of long grass, etc., I determined to work it early. As the slopes referred to were some 300 feet below the edge of the cliffs and entirely inaccessible from the top, I had to arrange overnight with a boatman to be in readiness for an early start. Having been duly aroused by a tap of an oar at my bedroom window, I went down to the beach, and finding everything ready, was afloat by 4.35 a.m. The spot desired was some three miles along under the cliffs, and, some delay being caused by a return to put ashore the crew of a yacht which had been brought up in the Bay overnight, it was past 6 a.m. before I reached my destination. Here I found it almost as precipitous as from the top, but managed to scramble on to the rocks. It was very cloudy and cold, so I saw nothing on the wing, but after well prospecting the ground, I was fortunate in coming across a good colony of *irrorella*. They were at rest on the grass stalks, some evidently just emerged, also many pairs *in cop.* I had no difficulty in filling my boxes without using a net, which, owing to the dangerous ground, would have been of very little use. Of the large number I examined (many more than I brought away), I was unable to find a single one of the desired variety, but was very much struck with two facts. One was the very local distribution of the insect, and also the abnormal expanse of wing of the males, many being over one and a half inches expanse. After an hour's working, the sun gleamed out, causing the males to fly for a few minutes rather wildly, and my boatmen signalled me, so I decided to return, and reached the Bay about 8.45 a.m., well pleased with my experience.—ALBERT J. HODGES, 2, Highbury Place, N. [This species is common in the Dover district, and the local collectors used to find it hanging on the grass on the cliffs in the early morning in large numbers. I have taken it abundantly near St. Margaret's Bay (Dover), and flying freely about 3.30 to 5.30 p.m.—ED.]

SUGARING IN 1890.—My experience of sugar, on the few occasions when I could get up to the woods near here, was not on the whole disappointing. The following notes may prove interesting: I have recorded the number of species, not of specimens, that put in an appearance. As a rule I was not able to stay out later than 10.30 or 11 p.m. The number of trees sugared was between thirty and forty. Most of the species were common, and I only mention those that are somewhat uncommon or do not occur here in any numbers:—

June 13. Nine species, including *Nola cristulalis*, *Hadena thalassina* and *Mamestra anceps*. June 14. At the same sugar (not even renewed), thirteen species, including *Aplecta tincta* (for the first time in this neighbourhood), *Xylophasia rurea* var. *combusta* and *Phycis betulella*. June 18. Warm, cloudy, windy; between 9 and 10.15, fifteen species, including *Dipterygia pinastri*, *Agrotis porphyrea*, and a very dark form of *Grammesia trilinea*. June 20. Fifteen species, including *Macaria notata* (from which I obtained fifteen ova and have now about a dozen pupæ), *Apamea gemina* and *Thyatira batis*. June 27. Sixteen species, all very common. July 8. Dark, warm, windy; just after rain. Thirty-six species, including *Cuspidia leporina*, *Agrotis corticea*, *Xylophasia hepatica* (both very scarce here), and *Hadena suasa*. The last not previously recorded from here. July 14. Warm, but very still. Four species, including *Cymatophora or*. July 18. Dark, windy, rainy, fairly warm. Fifteen species, including *Dicycla oo*, *Caradrina blanda* and *Rhodophæa tumidella*. Total, eight nights, 123 species, giving an average of rather more than fifteen species for each night.—G. H. RAYNOR, Victoria House, Brentwood. *January*, 1891.

ENTOMOLOGICAL PINS AND VERDIGRIS.—Can any reader of the *Record* suggest anything to prevent the formation of verdigris on pins?

I have tried almost every kind of entomological pin but with no success. White, gilt, and black pins are, as far as my experience goes, powerless to prevent the formation (sooner or later), and then "good-bye" to the specimen. It is very disheartening, after working perhaps three or four seasons for a particular species, to find the specimens gradually falling to pieces, thanks to the formation of this wretched stuff! I have been using Messrs. Tayler's black pins for some seasons, but, good as they are in some respects, they do not prevent the evil in question. I have been in communication with this firm recently, and suggested the use of platinum wire, but they inform me that though this metal is ductile enough to be drawn into the finest wire it is too soft for the purpose, and of course the addition of an alloy would defeat the end in view. Messrs. Stainton, W. H. B. Fletcher, and others all agree with me that "the perfect pin is yet to be found." Will some one turn his attention to the subject and try to find it?—A. THURNALL, 144, Chobham Road, Stratford New Town, E. *December 1st*, 1890.

HABITS OF SOME OF OUR SPRING MOTHS.—*Platypteryx unguicula* is taken in beech woods flying in the sunshine, or beaten from the trees in dull weather; *P. lacertula* and *falcula*, by shaking and disturbing them from the birch bushes or trees in the afternoon; *Tephrosia punctulata*, by searching the trunks of trees among birch; *T. biundularia*, on tree trunks in oak, birch, beech, and larch woods; *Pachyenemia hippocastanaria*, flying over heath at night; *Phytometra œnea*, flying in sunshine on hill sides, or started from the grass in dull weather; *Brephos parthenias*, flying about the tops of birch trees on sunny days (I find they are best taken between 4 and 6 p.m., as they fly lower then); *Tortricodes hyemana*, flying in the sunshine in oak woods in March; *Ennychia anguinalis*, flying in the sunshine on the chalk hills; for *Micropteryx purpurella* I take the "Bignell" tray and beat the young birches; *Semioscopus avellanella*, on the twigs of birch at rest; and *Pancalia lleuwenhoeckella*, boxed from flower heads of the daisy, on chalk slopes. *Adela fibulella*, on the flowers of *Veronica chamedrys*, last week in May; best obtained by sweeping flowers on sunny mornings; *Emmelesia albulata*, in damp meadows where *Rhinanthus cristagalli* grows, started from the grass; best got in the evening or on dull days, when it is readily started from its hiding places.—W. HOLLAND, Reading.

NOTE ON HYDRŒCIA PETASITIS.—Miss Kimber having asked for information as to how to obtain pupæ, I will offer a few remarks. To get *H. petasitis* pupæ, all you need is a good strong trowel, and plenty of patience. I mention this last essential, because, one day, I was out digging with a soft-handed collector, and, by the time he had got eight, he had had enough, at the same time showing me his blistered hands. Where we get them, they are so plentiful as to require no special method of working. We simply settle down and dig indiscriminately the ground before us, for *H. petasitis* larvæ leave the roots and effect a subterranean transformation. In places where they are unknown, and the food-plant occurs, search for affected plants, *i.e.*, plants with a burrow at the crown of the root. Suspicious plants with withered leaves break off, when the burrow made by the larvæ is disclosed. Many plants, though, are slug eaten, and the leaves withered from this cause. But those who undertake to get pupæ, have a rough job on hand.—J. COLLINS, Warrington. *December*, 1890.

EUPITHECIA EXPALLIDATA, NOCTUA SOBRINA AND ACHERONTIA ATROPOS IN ABERDEENSHIRE.—Last August, I captured a few *Eupithecia expallidata* at the flowers of ragwort. Can anyone tell me if this species has been taken in Scotland before? *Noctua sobrina* has been got in fair numbers in Aberdeenshire this year. Four years ago, I turned it up for the first time, and it has been got in gradually increasing numbers ever since. A few days ago, I visited a beginner, who collects among the hills; and he had several in his boxes in fairly good condition. He had also a ♀ *Acherontia atropos*, which was got fluttering on a potato plant last July. Is not this an early date?—W. REID, Pitcaple, N.B. *December*, 1890.

CLOANTHA SOLIDAGINIS.—This insect has been very common on Cannock Chase this autumn, a friend and myself capturing one hundred and fifty specimens in one afternoon. They are very easy to find, as they sit on the birch tree trunks during the daytime, principally with their heads thrust into some crevice in the bark, so that their bodies stand out at right angles to the trunks of the trees, rendering them conspicuous. Can anyone tell me, whether they have found this year a bad one for *Eupisteria heperata*, as last year, on the 8th May, I took some thirty or forty specimens in about an hour on Cannock Chase, while, this spring, on visiting the same spot on the same date, and on three occasions afterwards, I was only able to take *one* insect?—E. P. WRIGHT, Stone, Staffs. *December*, 1890.

LIFE-HISTORY OF AGROTIS PYROPHILA.—Since my notes upon *Agrotis pyrophila* have appeared in the *Record*, p. 214, I have had several communications upon the subject, and one correspondent points out, that my description of the larva does not agree with that given in Stainton's *Manual*. But, as I presume, Stainton's description is that of a full-grown larva, no wonder there was a discrepancy, as my description was taken from a newly-hatched one. As neither description can be looked upon as of much value, perhaps I may be allowed to add a little to what I have already said. While collecting in a good locality for this species, I noticed a moth, which, from the peculiar way it was fluttering among the long grass, I thought was a ♀ *Xylophasia polyodon*, busily engaged at the interesting ceremony of ovipositing, and, as I am ashamed to state, my knowledge of the early stages of this insect is very limited, I thought this a good opportunity of adding to that knowledge, so I determined to watch operations. As the night was dark, with a strong wind, and my footing anything but good, it was a difficult matter to keep the insect in sight. But, after careful examination, I was able to note that it always deposited on a withered grass culm, high up, and nearly always near the junction of a leaf with the stem, and, as far as I could see, only one ovum upon each leaf. It kept up a constant fluttering, all the time it was depositing, but, this suddenly ceasing, I at once detected, instead of a despised *X. polyodon*, an exquisite specimen of *Agrotis pyrophila*; and, in a trice, it was safely housed within a chip box. The thought crossed my mind, that I should let it out again, but the fear, that it might not renew operations, prevented me from doing so. The ova are light straw coloured, hardly to be detected from the withered grass stems, and, as I said before, very like those of *Tryphœna orbona*, but slightly smaller, and turn dark a few days before the larvæ emerge. The larvæ, when newly hatched, are dark greenish brown, with the faintest trace of a lighter line below the spiracles, and a few scattered bristles. They are extremely sluggish, and appear to be constantly sitting about, holding on to the withered grass with the last three pairs of claspers; the fore part of the body thrown back, and the head tucked in, after the manner of a *Sphinx* larva. The little pellets of excrement proved that they were eating the food-plant provided for them; but so slowly did they grow, that it was several weeks before I saw much difference in them. At last, they moulted, and, although this did not improve their size, it made a great difference in their appearance. Dorsal and sub-dorsal area brownish, a lateral series of wedge-shaped spots from the 5th to the 12th segment, just above the spiracular line, apex pointing forwards, and only crossing the anterior half of each segment; below the spiracles, a broad white line; a few bristles scattered over the dorsal and sub-dorsal area; posture and habits, same as before, but not so sluggish, and rolls in a ring, with the head on one side when disturbed. After the second moult, they may be said to assume the colouring and markings of the adult larvæ in miniature. The larva rolls itself into a ring when annoyed, and falls off its food-plant, but soon unrolls, and seeks shelter at a great rate. Head, shining brown; triangular plate, brownish black, with a brownish-black mark upon each side; dorsal line inconspicuous, extremely narrow, light brown with a darker line on each side, and a double series of brownish-black, medio-dorsal, V-shaped markings, the tips of the V's directed forwards. Sub-dorsal area, light brownish flesh colour, with a few very small brownish dots. A series of very distinct black marks on the 2nd and 5th to 12th segments, both inclusive, dividing the lateral white stripe below the spiracles from the sub-dorsal area. Each segment emits a number of short bristles, and, in some specimens, the dark-brownish, medio-dorsal stripes are decidedly tinged with green. Feeds upon grasses, dandelion (*Taraxacum officinale*), groundsel (*Senecio vulgaris*), and other low plants.—W. Reid, Pitcaple, Aberdeen. *November 25th*, 1890.

My *Agrotis pyrophila* larvæ are thriving well, and have moulted again; they have changed colour, and the markings are very much brighter. They are beautiful larvæ now, but still retain the bristles. I have managed to secure three at large.—Wm. Reid, *February 7th*, 1891.

Vanessa atalanta at Sugar.—I see that Newman mentions the liking *V. atalanta* has for sugared trees. I have observed as many as five or six on one tree by day, and several single specimens by night. I have also seen *V. urticæ*, *Epinephele janira* and *E. tithonus* at different times by night. Has any lepidopterist noticed these insects at sugar?—John N. Still, Horrabridge.

Colias hyale in the Spring.—I observe that in the January number of *The Entomologist's Record* the Editor expresses doubt whether *Colias hyale* normally hybernates as an imago. May I be allowed to state that about the middle of May, 1886, I saw a female of that species depositing her eggs on lucerne. That she was so engaged is certain as I found three of the eggs. In September, 1888, I found a large brood of *C. edusa* on the Downs near here. The first specimens—which were quite fresh—were seen on the 11th of that month. As I was anxious to obtain a good series, and, if possible, get var. *helice*, I was on the spot daily (Sundays excepted) until the 27th September on and after which day not a single specimen could be seen, although the weather continued, as it had been, very fine and bright. I concluded, and still believe, that they had retired to winter quarters wherever those may have been. At any rate it appears to me that the facts I have stated are not consistent with the idea that either of these species hybernates in the egg, larval or pupal condition.—R. D. POSTANS, Eastbourne. *Feb.*, 1891.

RETARDED EMERGENCE OF ASPHALIA RIDENS.—I have just bred a specimen of *A. ridens* (forced) from a larva beaten in the New Forest, June, 1889, having been two years in pupa. I only obtained five pupæ, two of which emerged in 1890, three lying over. I believe it is a general rule for this species to lie over in the pupal stage, as in 1887, I obtained about two dozen pupæ of this species, two of which I bred in 1890, having been in pupa three years, and all were kept out of doors under the same conditions. Of course, the greater number appeared in 1888.—EDMUND HANES, 16, Raveley Street, Kentish Town, N.W. *February 12th*, 1891.

REARING HEMEROPHILA ABRUPTARIA.—I captured a ♀ of *Hemerophila abruptaria* this summer, from which I had a fine brood, which I sleeved on lilac. At a rough guess, I have at present about seventy or eighty in pupæ. I reared them in hopes of obtaining vars. and also to become acquainted with the larvæ. I found them extremely easy to breed as I only had to re-sleeve them once, and, on that occasion, put the brood into two separate bags, in which they soon began to spin up. Some of them chose the crevices in the muslin forming a much slighter cocoon than those which spun on the twigs, as, when the muslin was stretched, nearly all the pupæ tumbled out. Those on the twigs form curious objects, lying one after the other, as many as six in some cases, all joined end to end. But what struck me most was the curious manner in which the larvæ (when at rest) hang pendant from the twigs. Perhaps it was owing to their being so crowded, but they reminded me more than anything else of the pictures drawn in seedsmen's catalogues of fabulous crops of peas.—HOPE ALDERSON, Farnboro', Kent. *January*, 1891.

ENTOMOLOGY IN THE MIDLANDS IN 1828.—In May, 1828, I commenced collecting around Bewdley. In the neighbourhood were small woods filled with young trees of aspen, birch, willow, nut, etc., while there were large open spaces covered with heath or grass. These localities were a perfect El Dorado. Some of the species which were abundant there, were *Leucophasia sinapis*, *Argynnis paphia*, *A. adippe*, *A. aglaia*, *Melitæa artemis*, several *Lycenidæ*, and all the "skippers," except *Hesperia actæon* and *H. lineola*. All the "tiger" moths, including *Arctia fuliginosa*, *Chelonia plantaginis*. *Arctia villica*, and *Euthemonia russula*, occurred; as also did the beautiful *Plusidæ*, *Plusia iota*, *P. bractea* and *P. festucæ; Liparis dispar*, and *L. monacha* were both found, as also were *Saturnia carpini* and *Bombyx rubi;* all the "Hook-tips" except *sicula*, and the "thorns" except *Ennomos autumnaria*. Two *Vanessa antiopa* were taken, one by a local collector, and one by myself; also, what was in those days a very great rarity, *Sphinx convolvuli*, the latter specimen ultimately finding its way into the Birmingham Museum. During the autumn, larvæ rearing and pupæ digging were the principal employments, although *Catocala nupta* was occasionally captured. Many species were obtained in the larval stage which were never seen as imagines, among others—*Ptilodontis palpina*, *Notodonta camelina*, *N. dictæa*, *N. dictæoides*, *N. dromedarius*, *N. ziczac*, etc., also *Stauropus fagi* and *Petasia cassinea*, both *Dicranura furcula* and *D. bifida* on young aspen, while hosts of others, as—*Liparis dispar*, *Dicranura vinula*, *Orgyia pudibunda* and the different *Platypterigidæ* were very abundant. I also found larvæ and pupæ of *Cossus ligniperda* and *Zeuzera æsculi*. Near Ribbesford *Abraxas ulmata* was abundant, but I chiefly worked this district for Coleoptera. Numerous species of the *Coccinella* and *Elator* genera abounded, together with some peculiar vars. of species belonging to these groups, and which, for some time, were supposed to be distinct species. One day's collecting this year (1828) deserves more than passing notice. In June, I passed a field of grass (ready for mowing), sprinkled with large white daisies. On these I saw hundreds of *Aporia cratægi*. I did not attempt to resist the temptation, and quickly jumped over the hedge, doing considerable damage to the grass. I filled my box and began to fill the crown of my hat with *cratægi*, when a countryman at the other end of the field appeared and threatened to send me to Worcester Gaol. However, I had as many as I wanted and quickly made off.—J. TYRER, Chatham, Kent.

NOTE ON LEUCANIA LITTORALIS.—Mr. Baxter (*ante*, p. 248) will find some difficulty with *littoralis*. They are not cannibals unless short of food, but are very often ichneumoned, and can get through a very small hole; in fact, they are the worst kind of larvæ for escaping I know. They will not thrive unless given a lot of sand and exposed to the sun, I find the best plan is to keep them in a fern case and feed them on marram grass growing in a pot, if this is done nearly all will go through all right excepting those ichneumoned.—G. HARKER, Liverpool.

DATES OF APPEARANCE IN 1890.—My experience, as to dates of appearance this season, does not altogether tally with Mr. Hodgkinson's (*ante*, p. 160). It would appear, that a few things have occurred earlier this season than they did last. This season, not a single larva of *Bombyx castrensis* was to be seen at Shoeburyness after the 19th of July, I took larvæ last year on the 30th of July. On the other hand *Hesperia lineola* occurred at Shoeburyness on the 30th of June in 1889, while this season it was quite a fortnight later. Upon the strength of my having taken *Catoptria candidulana*, at Shoeburyness on the 11th July last year, I promised, quite early in the season, to supply a correspondent of mine with a series. After several unsuccessful visits, I took a short series, but not until the 2nd of August. —F. G. WHITTLE, Lothbury. *December*, 1890. [These must be looked upon as quite exceptional. Everything appeared at an early date until the middle of June, after which, scarcely any species were up to date, so far as the large number of reports which have passed through my hands, and my own experience, show.—ED.]

FLOWERS ATTRACTIVE TO MOTHS.—At this season, those of us having gardens are thinking how best to lay them out to be attractive to moths during the summer. Former experiences published in the *Record* would, I am sure, be valuable to many. The following list, in the order written, I have found most successful:—Rockets, *Silene* *pendula*, catch-fly, red valerian, pinks, sweetwilliam, verbena, pansies, and violas; of shrubs:—*Berberis*, arbutus and honey-suckle.—PERCY RUSS, Culleenamore. *February*, 1891.

PŒCILIOCAMPA POPULI.—It may be of interest to note that I took several specimens of this insect in fine condition at the gas-lamps on January 5th. The thermometer was at freezing-point, atmosphere foggy, wind westerly, and the roads sheets of ice, with snow lying about This has been the most severe winter experienced in this locality for over twenty years.—J. MASON, Clevedon Court Lodge.

COLLECTING SALLOW CATKINS.—During last spring, I gathered a large quantity of sallow buds and catkins. For experiment, I kept one lot in band-boxes, another in a large flower-pot, and the rest in small lard tubs. From those in the band-boxes I got nothing but one *Eupithecia tenuiata* and one *Cosmia trapezina*. Is not this strange? Is it at all likely that I had a batch of ova, and that, when hatched, the larvæ fed on others and on each other until only one was left? Those in the flowerpot produced a few of all classes of sallow feeders. The best result, however, was from those in the lard tubs, in which *Hypsipetes elutata* and *Epunda viminalis* were most abundant. Of the latter, the forms were of all shades from light to the darkest, and some (very few) with a slight purple tint on them.—WM. MILBURN, Darlington. *January*, 1891. [It is very probable that the *Cosmias* dined off the others. Unless a calico covering was put under the band-box lid it is probable also that many larvæ would escape.—ED.]

UNCERTAIN APPEARANCE OF CERTAIN LEPIDOPTERA.—*Epunda nigra* at one time was about the most abundant insect at sugar in August, and *E. lutulenta* was also common; both disappeared about 1875 or 1876. *E. lutulenta* has not been taken here since then, and *E. nigra* rarely, only about a dozen in a season where they used to be taken in scores every night. *Euchlöe cardamines*, once common, has gradually become very scarce, larvæ of *Vanessa atalanta* in hundreds on every patch of nettle in 1884, since then not one. *Viminia myricæ*, once rare, can now be got in fair numbers almost everywhere. In 1889 *Agrotis exclamationis* appeared in hundreds of thousands; I once counted more than fifty on one streak of treacle.—W. REID, Pitcaple. *February*, 1891.

TIME OF DAY THAT SPECIES EMERGE.—*Sesia bembeciformis* may be taken freely on poplars about 7.30 or 8 a.m., drying its wings. *S. apiformis* emerges at the same time, and may be taken in the same manner; but I have not worked for it properly.—A. ROBINSON, Brettanby Manor, Darlington.

Leucania obsoleta always emerges between 7 and 8 p.m. The wings expand and dry very rapidly, and for a short time the insect sits head downwards with its wings closely appressed to the reed, looking like a node on the reed stem. It soon flies, however. *Callimorpha dominula* always appears to emerge from 7 to 9 a.m., and is generally ready for flight by 9.30 a.m. *Ellopia fasciaria* emerges in the early evening, 6 to 8 p.m.—J. W. TUTT.

Aplecta tincta, with me, emerges from pupa about 5 p.m., and has to be killed very quickly, or they injure themselves so as to become almost useless.—HOPE ALDERSON.

It may be interesting to lepidopterists to see some notes I have made during the past two seasons on the times of emergence of lepidoptera. I should be glad to hear if others' experience coincides with my own. *Tæniocampa rubricosa*, 11 a.m. to 12. *Notodonta trepida*, ♂ 2 to 5 p.m., ♀ 8 to 9 a.m. *N. trimacula*, 3.30 to 6 p.m. *Platypteryx lacertula*, 1 to 3 p.m. *Arctia mendica*, 1 to 3 p.m. *Macroglossa fuciformis*, 12 to 2 p.m. *Eupithecia sobrinata*, 5.30 to 7 p.m. *Orgyia pudibunda*, 12 to 3 p.m. *Nola cucullatella*, 8 to 9 a.m. *Notodonta dictæa*, 9 to 11 p.m. *Chesias spartiata*, 5 to 7 p.m. *Catocala fraxini*, 10 to 11 p.m. *Agriopis aprilina*, 6 to 7 p.m. *Amphydasis prodromaria*, 1 to 2 p.m. *Eriogaster lanestris*, 12 to 1.30 p.m. I have noted the times of emergence of many other species, but am not able to speak confidently about them as yet. It would be extremely interesting to learn, from the experience of various collectors, if different conditions cause the insects to emerge at different times. Very few entomologists treat their pupæ in the same manner, and if many would carefully note the times of emergence, much interesting information may be gleaned.—M. Kimber. *January*, 1891.

It may interest Miss Kimber to learn that my experience with *Platypteryx lacertula*, *Arctia mendica*, and *Notodonta dictæa* is exactly similar to her own, but I have had *Orgyia pudibunda* out as early as 10 a.m. *Viminia myricæ* generally appears between 1 and 4 p.m., and the two *Xanthias—cerago* and *silago*—always appear in the afternoon, while *Eupithecia venosata* is always ready for flight before 11 a.m. My pupæ are kept in the open air, in some cases beneath a shelter.—Wm. Reid, Pitcaple, Aberdeen. *February*, 1891.

Information Wanted.—I should be extremely obliged to any generous lepidopterists, who can give me any hints as to localities for rare species in the following counties:—Perth, Inverness, and Sutherland, or if they can refer me to any published records of captures from these localities. Any information I will look on as strictly confidential.—Id.

Success or Non-success at Sallows.—I can quite endorse Mr. Holland's remarks (*ante*, p. 39). Last year (1889) I took a lot of *Tæniocampa munda* at sugar, although there were but one or two on the sallows. I believe the success or want of success at sallows, arises principally from the nature of the locality. Most of the *Tæniocampidæ* are tree-feeders, and *cruda*, the most abundant of all, is almost a woodland species. *Instabilis* and *gothica*, on the contrary, appear to prefer open country and gardens, frequent plum-trees in bloom, and come to light. The larvæ generally are very common. The species of sallow is another point to consider, and ♂ blossoms are of course better than the ♀, but I believe success at sallow blossoms depends on searching them as soon as possible after they expand. Nothing is so unattractive in this district, in the spring, as the over-blown sallows. Half-expanded blooms, on the other hand, are often very attractive.—C. Fenn, Burnt Ash Hill, S.E.

Larvæ of Xanthia citrago.—The larvæ of *Xanthia citrago* roll the leaves of lime, or rather fold the edges over, making a kind of nest. They were full fed about the first week of June, but did not turn into pupæ (inside the leaves on the top of the earth) till the last week of July and the first week of August. They began to emerge about the second week in August. Mr. Holland also took one feeding on nut, which I think is a new foodplant for it.—R. B. Robertson. *Dec.*, 1890.

The larva of *Xanthia citrago* is an old friend of mine. I have not taken any since 1872, but previous to that date I took scores in this district, and to my knowledge they never *rolled the leaves* together to feed in, but ensconced themselves between two flat leaves, secured with a silk web, similar to *Tæniocampa populeti*, and other out-of-sight feeders. At *Ent.*, vol. vi., p. 258, Mr. Porritt, describing the larva, says:—"In preparing for the last moult they enclose themselves in loose cocoons formed by drawing together two leaves with silken threads," etc. The way we used to find the larva was to stand underneath the young limes, so that we had the delicate young (almost transparent) leaves between our sight and the sky, when the larvæ could be plainly seen between the two adherent leaves.—J. HARRISON, Barnsley.

I must entirely endorse Mr. Harrison's remarks about *Xanthia citrago* larvæ as far as the leaf rolling habit is concerned, and I think the idea must have originated in this way: *citrago* larvæ, like many of the group, are nocturnal feeders, concealing themselves either between leaves, under bark, among rubbish, in crevices of bark, etc., by day, and coming out at night to feed. In captivity, the lime leaves soon wither and curl up, and these curled leaves would be most convenient hiding places for the larvæ in the day time, in which they would spin thin, slight cocoons. The lime trees in avenues, parks, and on roadsides usually have some of the lower branches removed, and, this being done annually, causes a woody excrescence to be formed on the trunks by the numerous small twigs with abundant leafage. These spots I have found to be the favourite feeding grounds of the *citrago* larvæ if searched for after dark; but except on lime bushes, where they have fewer opportunities for concealment, it is useless to attempt to beat them out by day.—C. FENN, Lee. *Dec.*, 1890.

FRATRICIDAL CONDUCT OF HEMEROPHILA ABRUPTARIA.—Some larvæ I had of *H. abruptaria* in 1889, when full fed, made their cocoons from the particles of the wooden roof of the breeding cage, and a great many were formed by the later larvæ over the cocoons of those which had pupated earlier. Over part of the roof there were, in fact, two layers of pupæ in their cocoons, and, of these, only the outermost emerged. After some time I removed the cocoons, and discovered that the earlier moths had obtained an exit from their own cocoons, but had all died in the second, not one having passed through the two. I have had the same thing happen with *Dicranura vinula*.—(Miss) M. KIMBER, Newbury, Berks. *Dec.*, 1890.

PERONEA HASTIANA.—Among the many specimens of *Peronea hastiana* I have bred, one is very like *P. comparana*, so much so, that, if I had not bred it, I might have passed it over. It was the only one of this variety I bred. Can anyone account for the scarcity of *P. hastiana* in the imago state? All the larvæ I got came through successfully, but I tried, time after time, beating with a lantern at night, and every way, but they never were to be seen, although there must have been thousands all round me. Do they fly at any particular time? In the breeding-cage they seemed to be more lively just at daybreak; but I never had the opportunity to go out on the sandhills at that time. When do they lay their ova? It is curious that the ova should lie by such a long time, if they are laid now (November) and lie over until next August before hatching. I found no trace of the larvæ until well on into August, and the imagines began coming out in September. I have, during the last week, captured imagines of *hastiana* with those of *Gracilaria stramineella* and numbers of *Depressariæ. Hastiana* may lay its eggs in the autumn, but I think it probable they are laid after hybernation, and that there is only one brood, although it is commonly supposed there are two.—T. BAXTER, St. Anne's-on-Sea, Preston. *February*, 1891. [Although I have had large quantities of willow and sallow buds, I have never had early specimens of *P. hastiana.*—ED.]

CRAMBUS MYELLUS.—This certainly should become common. We can scarcely recognise a "grass moth" being otherwise, though *C. alpinellus* is very local, and *C verellus*, hitherto, has only been "fluked." The first British specimen of *C. myellus* was captured, sitting on a grass culm in a pouring rain (and another seen) by Mr. N. Brown, then curator to Mr. Wilson Saunders, on a hill side about three hours' walk from Aberdeen, and brought to me to identify the following week as a doubtful *C. pinetellus.* From the British Museum collection, I quickly ascertained its name, and it was exhibited at the Linnæan and London Entomological Societies by Mr. Saunders' son, as new to Britain. Occasionally the insect has been met with since (on one date, I think, nearly twenty were taken), and these captures have been spread over so many years, that the insect must be persistent, not sporadic. I heartily congratulate Mr. Reid upon getting it so near home. He will doubtless render a good account of it in the future.—SYDNEY WEBB, Dover. *November 28th*, 1890.

I am much obliged to Mr. Webb for his note upon *C. myellus.* I do not know of any hills within three hours' walk of Aberdeen, but of course this depends upon what one considers a hill. In any case, the locality must either be west or south-west from Aberdeen. The place, where my recorded specimen (*ante*, p. 215) was obtained, is twenty-two miles from Aberdeen, and I now find it has been taken there three years in succession. I have just found one among my series of *Crambus pinetellus*, taken by myself two years ago. The real fact is, no one hereabouts pays the slightest attention to the Micros.—W. REID, Pitcaple. *December*, 1890.

KILLING LEPIDOPTERA.—As one who has tried different ways of killing insects, I certainly must give the palm to the use of ammonia. The ammonia of use to us, the ordinary chemists do not seem to retail. The most concentrated must alone be used, viz., that labelled ·880 If used properly, the universal opinion must be that it is the surest, cleanest, most economical and effectual agent one can expect to get. My general method of using it is the following. A large tin, say a biscuit tin, with a closely fitting lid is procured. Then I cut a piece of perforated zinc to fit the bottom, and turn one corner up to facilitate removal. On the bottom of the tin, I place some cotton wool to absorb the ammonia. Supposing I have a number of specimens to kill, I first tilt the lids of all the boxes, pour, say a couple of teaspoonsful or thereabout of the strong ammonia on the wool, and then rapidly replace the perforated zinc and pile in the boxes. The tin should then be put in a cool place to prevent the too rapid evaporation. I generally leave mine in till morning, if I kill at night; till evening, if I kill in the morning. Those who use chip or glass bottomed boxes will find that ammonia fumes somewhat "interfere with their structure," and will have to strengthen them with thin strips of linen and shoemakers' paste, upon which latter it has very little effect. The tin, boxes, etc., will always need a good airing after use. When the insects are taken out, they should be left for half an hour or so before pinning, as ammonia renders the pins very brittle.—H. J. TURNER. *January*, 1891.

The notes on this subject have been very interesting to me. Five years ago my difficulty was the "killing" question. I took to cyanide, but I found the insects so stiff as to take a great deal of time in setting. I knew most people used cyanide, and could not find out why I was unsuccessful, when I came across the method of using carbonate of ammonia suggested in Dr. Knagg's booklet. I tried it, with delightful results, and found setting moths a pleasure. I found that to partly open fifty or sixty chip boxes and cover them in airtight, was troublesome, in addition to which the exposure of the ammonia lessened its efficacy, and I found I often wanted to kill my captures in the field, which I could not do by this means; so I cleared out my cyanide bottles, obtained some strong carbonate of ammonia (at ½d. an ounce) and broke it up rather small, placed in the bottle about as much as there was previously of plaster of Paris, and cut out circular pieces of stout white blotting paper a little larger than the inside of the bottle, placing three or four thicknesses into the bottle, and the blotting paper, being a little larger in diameter, wedged in, and sufficiently kept the ammonia in place. I had then a convenient and satisfactory killing bottle! I made many and used them for about three years. Its success caused two "old stagers" to give up cyanide and use the same means. After a time came (from one of these) insidious doubts and whispers as to the effect of the ammonia on the insects. I scorned the insinuation, but the canker was there, and in time I came reluctantly to the conclusion that my insects, in many cases, did look dull, and that the green on *Hadena protea* and *Miselia oxyacanthæ*, etc., was not all I could wish, and I found it spoil *Agriopis aprilina* and such like green insects. Again in despair I consulted a collector of many years' standing, who, I knew, always used cyanide, as to how he managed so well. The reply was "leave them in the cyanide from thirty-six to forty-eight hours and you will have no difficulty." I ousted the ammonia and again tried its rival. The result is most satisfactory; now and again I find an insect stiff, but that has been when I have taken a moth out too soon. I have not noticed how either method affects the time required for the setting of the moths, that is quite a new question to me.—J. E. K. CUTTS, Bushey. *December 27th*, 1890.

SETTING LEPIDOPTERA.—I was very pleased to read Mr. C. Fenn's able article on this subject (*Record*, p. 253). For myself, I have been an advocate of *high*-flat setting. Now, by *high* I do not mean the continental method of setting an insect at the top of a very long pin, but just a sufficient height to keep the wings well off the paper when placed in the cabinet, and which is *high* compared with many peoples' setting, who prefer to see the wings and bodies of their specimens touching the paper, and consequently much easier of access to mites. The body of an insect should not touch the paper, for if the insect grease, the paper is not then discoloured, and the body is less accessible to mites. I cannot conceive, however, why the curved method should be more *natural* than the flat, though Mr. Fenn tells us it is so. What we apparently wish is a perfectly uniformly set collection. This can never be obtained with the convexed method, as hardly two boards are curved alike. Flat boards cannot differ, and the insects set thereon must be uniform. Curved boards generally render many insects, especially Geometers, too curved. Flat boards render this practically imperceptible and improve the appearance rather than otherwise. Everyone sets to please himself. I know many strongly object to using flat boards. For myself, I should prefer to have all my insects set with exactly the same curve, but, as I could not arrive at that degree of perfection, I commenced with the flat ones, and I find them to be the only ones from which I can get really satisfactory results, especially with the *Eupitheciæ*, etc., which are apt to give to an alarming extent. By the by, in nature, do the *Eupitheciæ* "sit" with their wings curved? I believe they expand them quite flatly as I set them. *Re* the boards themselves, flat as well as oval ones are obtainable from all dealers, who will persist in making the groove for the body not deep enough, and not in two degrees of width. I quite agree with Mr. Fenn with regard to the sizes he gives for pins. I always prefer black enamelled pins, but of course, everyone to his own taste.—A. E. HALL, Norbury, Sheffield. *December*, 1890.

TRICHIURA CRATÆGI.—I was surprised to see in the January number of the *Record*, a note from my friend, Mr. Hewett, stating that he beat eight larvæ of this species at Lyndhurst in the middle of September. If he has the opportunity of referring to the *Entomologist* of October, 1874, he will find on pp. 228, 229, some notes on this species. It is an insect, so far as my experience and information go, of undeviatingly regular habits. The moth emerges towards the end of August or beginning of September. The eggs are deposited immediately, and do not hatch till the whitethorn bourgeons in the following March. What the larvæ were that Mr. Hewett beat off sallow, I can only guess. The choice seems to lie between *Liparis auriflua* and *Lasiocampa quercifolia*; but I feel sure they cannot be *T. cratægi*.—GILBERT H. RAYNOR, Victoria House, Brentwood. *January 19th*, 1891.

APAMEA OPHIOGRAMMA.—I took six specimens of this moth in my garden last summer. I have collected here intermittently for the past five years, but have not seen it before. *Plusia chrysitis* and *P. iota* have appeared freely this year. I took them specially at valerian and sweetwilliam blossom.—J. E. K. CUTTS, Bushey, Herts.

NOTE ON VIMINIA MYRICÆ.—I was out one day last week searching for *V. myricæ* pupæ, and was very successful, taking as many as two or three on one stone, but after two hours' work, I gave it up for the day, as it was so cold. This species is distributed over all the lowland districts of Aberdeen and Kincardine (I have seen the larvæ below high-water mark at Muchalls), but in Perthshire it is almost confined to the mountains. It has the reputation of being difficult to rear from ova, but, if fed entirely on birch, there is no difficulty. The ♀ deposits ova naturally upon clods and stones, more rarely on the food-plant, and if one ovum be got, more can always be obtained, as they are generally laid in batches of threes or fours, and they are very easily seen from their bright red colour.—W. REID, Pitcaple. *December*, 1890.

TIME OF APPEARANCE OF MIANA STRIGILIS AND M. FASCIUNCULA.—I see (*ante*, pp. 243, 244) a note by Mr. Porritt, in which he mentions that in his district *Miana fasciuncula* always precedes *M. strigilis*. Here they appear together in June, and I take them side by side at sugar. They are particularly partial to sugared leaves of the stinging nettle.—W. F. JOHNSON, Winder Terrace, Armagh. *December 24th*, 1890. [I have many more communications of a similar nature, but as only this is of scientific interest because Mr. Johnson captured the doubtful specimens, I have omitted them.—ED.]

AGROTIS ASHWORTHII IN ANGLESEY.—In August, I took one imago of *Agrotis ashworthii* in Anglesey. I fancy this is a new district for it. —T. TUNSTALL, Warrington.

DEILEPHILA GALII AT CLAPTON.—*Deilephila galii*, if one may judge from the few records of its capture, has been rare during the past season (1890); it may therefore be of interest to note that on August 12th last a specimen, in good condition flew in, to a light in the house and was captured by myself.—JAS. A. SIMES, Cricketfield Road, Lower Clapton, E.

EUDOREA ULMELLA (SCOPARIA CONSPICUALIS) IN THE CASTLE EDEN DISTRICT.—On the 20th of August last, whilst collecting in a wood in the Castle Eden district, with my friend, Mr. John E. Robson of Hartlepool, we came across a few *Eudorea conspicualis* (*ulmella*) sitting on tree trunks.—T. MADDISON, South Bailey, Durham. *Sept*.. 1890.

ARCTIA CAIA EMERGING IN DECEMBER.—A specimen of *Arctia caia* emerged, a few days before Christmas, from a single larva (out of several hundreds) which thought fit to feed up and pupate in November. The others seem to be hybernating all well.—R. DUTTON, Castle Mills Bridge, York. *January*, 1891.

STRANGE PUPATION OF DICRANURA VINULA.—I have had brought me this winter, two cocoons of *D. vinula*, one attached to a brick in a front wall, and one to a board underneath the floor of an empty house, where it must have crawled during the building. They were taken in the neighbourhood of Crouch End, and, so far as I can ascertain, the pupæ are both alive. I have kept both for the inspection of anyone interested.—GEORGE PENN, 12, Hornsey Park Road, N. *January*, 1891.

EROMEA OCELLEA.—I wonder whether it will throw any light on the habits of this rarity by stating that one of my specimens is as greasy as any internal feeder. Most of the Crambi feed among moss, or at the roots of grasses. *Ocellea* may be a stem feeder; nothing appears to be known about its habits in this country, and only some half-dozen specimens have ever been taken.—J. B. HODGKINSON, Ashton-on-Ribble. *February 8th*, 1891.

HABITS OF THE LARVÆ OF GONOPHORA DERASA.—On October 4th, I beat from *Rubus fruticosus* a larva of this species, and, as Newman's book does not fully describe its habitat, a few notes of my observations might prove interesting to those who have not yet had the pleasure of rearing this caterpillar. On reaching home I placed the larva in a roomy cage (with glass sides) about 11 inches high, and supplied it with a long spray of bramble, keeping it fresh by means of a small bottle of water inserted in the sand at the bottom of the cage. The larva at once commenced to conceal itself by burying under the moss with which the top of the sand was littered; it hid there during daylight, but when darkness set in it crawled from its hiding-place, ascended the bramble, and commenced feeding on the topmost leaf.

It did not fall from its foodplant when the rays of the lamp fell on it, but ceased feeding, and rested with its anal extremity raised. The next morning I found it had again hidden under the moss, but in the evening I found it attacking the same leaf, where it had left off feeding the previous night. On the third day I found it had not gone under the moss, and I was at a loss to find its whereabouts for a time, but at last discovered it had formed a little habitation by fastening the edges of two leaves firmly together at the bottom of its foodplant. On seeing this I very gently opened part of the leaves, which I found were fastened together by a kind of glutinous silk, and therein discovered my interesting little friend lying partly curled up and apparently very snug, and I did not further disturb it. When darkness set in, it left its little house and again ascended to the top of its foodplant, and I found it invariably commenced feeding from the same leaf it had left unfinished at its former meal. The morning following I found it had retired within its fort and closed the door, and, when once this had been done, it was impossible to tell where it let itself in and out, although, by careful watching, I afterwards ascertained that it always made its exit or ingress at one particular spot between the edges of the leaves! but what mostly interested me was to see it each night for about a fortnight leave its domicile, ramble to the end of its spray of food, and, after having its feed, retire before the morning dawned, to its same abode. It did not eat the leaves close about its place of refuge, but always made its way to the top of its foodplant, and ate the leaves off clean downwards. This would suggest that in a state of nature the larva would be found feeding at the extreme end of the brambles. The larva is a very small eater. When it had eaten up about a third of the leaves from the top of the plant, I inserted a freshly cut spray, but it never touched the leaves of this; it seemed to have learnt its road to and from its residence on the first piece, and it would appear as if it were afraid of straying on to the new piece of bramble, which was by the side of the other, for fear of not being able to find its way back. It may appear strange, but I always found it on the first spray up to the time it pupated, about two weeks after its capture. The cocoon was made not with leaves, but with moss and sand. I was impressed with the instinct such a small creature possessed, in finding its way back to the same retreat, and that it never ate part of its own dwelling. From my observations, the larvæ are entirely night feeders, never venturing abroad during daylight. It is a bright caterpillar, of a raw sienna-brown colour, as Newman says; but my specimen had the medio-dorsal stripe much darker, instead of being "paler;" in fact, the stripe was very dark brown inclining to black, the white spots on the fourth segment had a slightly yellowish tint. I have no doubt it is gifted with its mode of concealment on account of its bright colours, which would be very conspicuous on the dark leaves of its foodplant, but in the home it constructs it can lie concealed the whole day from the most prying eyes. I beat the bramble for more than half a mile, in hope of thrashing out more larvæ of the same species, but failed to do so. It would be a difficult matter to beat them out when they are once fastened up in their retreat; another season I shall do beating or searching for them when they are taking their evening rambles.—GEO. ELSON, Densham Cottage, Plymouth.

THE LEPIDOPTERA OF BROCKLEY.—Perhaps a few notes on the Macro-lepidoptera of Brockley, a district lying just outside the four mile radius from Charing Cross, will not be uninteresting to some, and may help to show that, even in our near suburban districts, a very respectable number of species may be collected, even by those whose opportunities are very limited. The observations have been all made during the last four years (1887-1890). Among the Butterflies, *Pieris brassicæ* and *P. rapæ* occur everywhere, and *P. napi* has occurred. *Gonopteryx rhamni*, one hybernated female. *Vanessa urticæ*, sparingly. A few *V. atalanta* and *V. cardui*, and of the latter, one larva. *Epinephele tithonus*, a few. *Cænonympha pamphilus*, *Polyommatus phlæas* and *Lycæna icarus* on the railway banks. One *Hesperia sylvanus* in the garden. Of the Sphinges, *Smerinthus ocellatus*, *S. populi* and *S. tiliæ* occur, the two latter commonly in the larval stage. They can easily be found by searching the pavement for their frass. *Sesia tipuliformis*, in the garden, I believe from currant bushes bought by my neighbours and myself at Carter's. The species has occurred each year. *Nola cucullatella*, very common as larvæ, a few very dark ones have been bred. *Euchelia jacobææ*, has been taken. *Arctia caja*, larvæ very common, and I had one imago of *A. villica* brought me this year. *Spilosoma fuliginosa*, used to occur on the railway. *Spilosoma lubricipeda* and *S. menthastri*, larvæ very common. Those I took this year, I fed on ivy, and am anxiously awaiting the result. *Hepialus humuli*, common at dusk. *H. sylvanus*, one. *H. lupulinus*, common, often taken in day time, by searching the undersides of planks lying among grass. One or two of the white forms have been taken. Larvæ of *Cossus ligniperda*, common, I took one imago in Lyndhurst Grove, Peckham. *Zeuzera pyrina*, fairly common, I took one female on an apple tree of minute dimensions in the garden. *Porthesia chrysorrhœa*, a few. *Orgyia antiqua*, common of course. *Bombyx neustria*, a few larvæ on hawthorn. *Cilix glaucata*, a few, both larvæ and imagines. *Dicranura vinula*, larvæ common on poplar. *Phalera bucephala*, larvæ occurred each year on the same bush. *Bryophila perla*, on most walls. *Cuspidia psi*, the larvæ common on trunks of lime trees. *C. aceris*, one larva now and then. *C. megacephala*, larvæ common. *Leucania conigera*, a few on fences. *L. pallens* and *Gortyna flavago*, one or two. *Hydræcia nictitans*, at flowers. *Xylophasia lithoxylea*, and *X. monoglypha*, at light. *Luperina testacea*, at privet flowers. *Mamestra brassicæ* and *M. persicariæ*, larvæ very common, imagines at flowers with *Apamea ophiogramma* and *A. didyma*. *Miana strigilis* and v. *æthiops* at lily and privet bloom with *Caradrina quadripunctata*, *Agrotis segetum*, *A. exclamationis*, and *A. nigricans*. *Noctua xanthographa*, larvæ under tufts of grass at Christmas time. *Triphæna fimbria*, *T. comes*, and *T. pronuba* in the larval stage, the last very common. *Mania typica*, larvæ very common, often feeds on currant. One or two larvæ of *Calymnia trapezina*. A few *Hecatera serena*, on one fence. *Polia chi*, one or two. *Miselia oxyacanthæ*, a few larvæ. *Euplexia lucipara* and *Phlogophora meticulosa*, one of each. *Hadena trifolii* and *H. oleracea*, larvæ abundant on *Chenopodium*: the latter feeds well on London-pride. *Habrostola tripartita* a few. *Plusia iota*, several have flown in to light. *P. gamma*, the larvæ feed and spin up on geraniums in the garden. *Euclidia mi*, one on the railway bank. *Catocala nupta*, one larva and several imagines on a wall. *Uropteryx* *sambucaria*, common, the larvæ feed on ivy in the garden. *Rumia luteolata*, very common. *Crocallis elinguaria*, larvæ common. *Eugonia quercinaria*, on fences and trunks. *Phigalia pedaria* and *Biston hirtaria*, larvæ of the latter common on hawthorn. *Hemerophila abruptaria*, common. *Boarmia repandata* and *B. gemmaria*, of the latter I bred v. *perfumaria* from larvæ taken on ivy. *Acidalia incanaria*, on fences. *Halias vauaria*, and *Abraxas grossulariata*, common in gardens. The two varieties of the former species occur in about equal numbers each year. *Hybernia rupicapraria*, *H. leucophæaria*, *H. marginaria*, and *H. defoliaria* all occur more or less commonly, both as imagines and larvæ. *Anisopteryx æscularia*, with the former on fences. *Cheimatobia brumata* and *C. boreata*, the former common. *Oporabia dilutata* a few. *Larentia didymata*, one. *Eupithecia oblongata*, common in the gardens. *E. subnotata*, larvæ very common. *E. vulgata*, on fences. *E. rectangulata*, a few. *Hypsipetes trifasciata*, one. *H. sordidata*, larvæ common on hazel. *Melanippe fluctuata*, very common, I have taken several good varieties, it is the most variable species for size I know. *Camptogramma bilineata*, abundant. *Cidaria dotata*, larvæ in gardens. *Pelurga comitata*, larvæ common. *Eubolia limitata*, common on railway banks. *Pyralis costalis*, one, and *P. farinalis*, several. *Scoparia ambigualis*, one. *Eudotricha flammealis*, a very nice series from the railway bank. *Eurrhypara urticalis*, common in the garden. *Scopula olivalis*, a few. *Botys ruralis*, common. *Ebulea crocealis*, one. *Pionea forficalis*, very common. *Cataclysta lemnalis*, common. Of the Pterophori *Platyptilia gonodactyla*, *Pterophorus monodactylus*, and *Aciptilia pentadactyla* occur, the first mentioned is very common in both broods. *Crambus prætellus*, *C. pinetellus* (two), *C. perlellus*, *C. warringtonellus* *C. culmellus*, and *C. hortuellus*, occur fairly commonly in fields and roughs. *Ephestia ficella*, one in the house. I have not worked systematically at the Tortrices and Tineæ, but they are, as regards numbers, as well represented as the Macros. No doubt, other entomologists in the district have taken species which I have not. It would be well for them to record their observations as a contribution towards the fauna of our rich suburban districts.—H. J. TURNER. *Jan.*, 1891.

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE

LEPIDOPTERA.

Daphnis hypothous, Cramer. A specimen was taken at Crieff, N.B., some years ago, and recorded at the time as *Chærocampa* [*Daphnis*] *nerii*, see Entom. Soc., Feb. 4, 1891. The species is a native of Borneo, Java, and Ceylon.

COLEOPTERA.

Scyphophorus interstitialis, Gylh., a curculionid, native of Haiti and Mexico; and *Aceraius comptoni*, Kaup, a species of Lucanidæ, native of Ceylon, were found by Mr. Bowring in his greenhouse [probably at Windsor], and exhibited by Mr. C. O. Waterhouse before the Entom. Soc. on Feb. 4.

HOMOPTERA.

Lecanium sarothamni, n. sp., J. W. Douglas, *E.M.M.*, 65. Hereford, found by Dr. Chapman on broom.

Lecanium ciliatum, n. sp, J. W. Douglas, *E.M.M.*, 67. Devon and Delamere Forest, on oak.—T. D. A. COCKERELL.

CURRENT NOTES.

A Special Index, containing every reference to the various species mentioned in Vol. I. of *The Entomologist's Record and Journal of Variation*, will be ready for issue in a few days, price 1s. Application should be made at once to Mr. A. J. Hodges, 2, Highbury Place, N.

Lord Walsingham, in his Address to the Fellows of the Entomological Society, said: "Already we have to welcome a new publication, *The Entomologist's Record and Journal of Variation*, edited by Mr. J. W. Tutt. . . . An especially interesting line of inquiry as connected with the use and value of colour in insects, is that which has been followed up in Mr. Tutt's series of papers on 'Melanism and Melanochroism' in *The Entomologist's Record.*"

The Annual Exhibition of the South London Entomological Society will be held at the "Bridge House" Hotel, on Wednesday and Thursday Evenings, the 15th and 16th of April next. Tickets from the Secretary, 83, Brayard's Road, Peckham, S.E.

The London and Provincial Societies are all apparently in a very active state just now. The *Miana* epidemic has touched Liverpool; we expect to hear of its arrival in Scotland very shortly. Mr. F. N. Pierce, at a meeting of the Lancashire and Cheshire Entomological Society, considered that he could distinguish *M. strigilis* and *M. fasciuncula* by the structure of the genital armature.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March 4th*, 1891.—The Right Hon. Lord Walsingham, M.A., F.R.S., Vice-President, in the Chair. Mr. F. P. Pascoe exhibited, and made remarks on, a curious Coleopterous larva with a case somewhat resembling that of the Lepidopterous genus, *Psyche*, which was found at the Theatre of Bacchus, Athens. Mr. J. W. Douglas sent for exhibition specimens of *Icerya (Crossatossoma) ægyptiaca*, which, through the kindness of Mr. A. D. Michael, he had received from Alexandria on the 19th January last It was stated that in travelling most of them had become loose, and had lost their waxen appendages; but a few still remained on the stems of their foodplant. In connection with this subject, Mr. G. H. Verrall alluded to a Dipterous parasite of *Icerya* from Adelaide—*Lestophonus iceryæ*, Williston—which had been bred from *Icerya purchasi*, Mask., last February. Mr. McLachlan and Lord Walsingham continued the discussion. Mr. R. Adkin exhibited a long and interesting series of *Triphæna comes* (*orbona*), from various parts of the South of England, Yorkshire, Forres, the Isle of Man, the Isle of Lewis, and the North of Ireland. Mr. G. F. Hampson exhibited a series of varieties of *Plotheia frontalis*, Walk., which was the only species in the genus, and confined to Ceylon. He said that the varied forms of this species had been described under twenty-one different names by Walker, Felder, and Moore. Mr. F. Merrifield showed a number of specimens of *Selenia illustraria*, of three different stocks, proving that the spring brood of this species, which passed the winter in the pupal stage, was, like the summer pupa, materially affected in colouring by the temperature to which the pupa had been exposed in its later stages. He thought this fact, coupled with similar results ascertained with respect to the single-brooded *Ennomos autumnaria*, indicated that the operating cause was one of wide general application, and that valuable results might be looked for if entomologists would turn their attention to the subject. Capt. Elwes said that in his experience in many parts of the Palæarctic region, in Japan, in the Taunus Mountains, on the north-eastern part of the Mediterranean, in the Canary Islands, and elsewhere, where there was a combination of heat and moisture, all the commoner species of Lepidoptera occurring in this country attained a larger size and a greater brilliancy of colouring than in colder and drier regions; and he referred to such species, amongst others, as *Pieris brassicæ* and *Argynnis paphia*. The discussion was continued by Mr. Jacoby, Mr. Fenn, and others. Mr. W. H. B. Fletcher exhibited a long series of *Zygæna lonicerœ* from York, and *Zygæna filipendulæ* from Shoreham, Sussex; also a series of hybrids obtained by crossing these two species. He stated that the eggs obtained from these hybrids were all infertile. Lord Walsingham said this latter fact was extremely interesting. Mr. F. W. Frohawk exhibited a living specimen of an ichneumon which had just emerged from a chrysalis of *Papilio taunus*. Mr. C. J. Gahan exhibited a number of species belonging to the genera *Lema* and *Diabrotica*, and read a paper on them, entitled "On mimetic resemblances between species of the Coleopterous genera *Lema* and *Diabrotica*." Lord Walsingham, Mr. Jacoby, Colonel Swinhoe, and Mr. Champion took part in the discussion which ensued.—H. Goss and W. W. Fowler, *Hon. Secretaries*.

City of London Entomological and Natural History Society.—*February* 19*th*, 1891.—Exhibits: Mr. Clark, *Noctua conflua*, bred from ova; larvæ of *Cossus ligniperda*, showing the pale form usually obtained in the spring; also a photograph of a white frog. Mr. Battley, varieties of *Chelonia caja*. Mr. Milton, *Xanthia silago*, *Cidaria immanata*, *Pyrausta punicealis* and *Botys flavalis*; also the following Coleoptera:—*Phœophslus edwardsii*, *Zeugophora flavicollis*, *Trachyphlœus spinimanus* and *Melandria caraboides*. Mr. Heasler, *Cicones variegatus* (taken under beech bark), *Megacronus inclinans*, *Agathidium varians*, *Bembidium mannerheimi*, *Tachinus subterraneus*, *Coryphium angusticollis*, etc., all from Loughton. Mr. Battley said that he had been to Richmond Park, and taken *A. leucophæaria*, *H. defoliaria*, *C. brumata*, *P. pilosaria*, and one specimen of *N. hispidaria*. He also drew the members' attention to the new part of Epping Forest

(Higham Park) which had just then been thrown open to the public. Mr. Milton had been to Richmond and Enfield, and taken several of the spring insects. He remarked that specimens of *H. defoliaria* were still to be obtained in good condition, their emergence having probably been retarded by the long frost. The Secretary read a paper by Mr. J. E. Robson on *Abraxas pantaria*, in which he expressed his opinion that this species, *Abraxas ulmata*, *A. leopardina*, and many other Asiatic forms, were but varieties of one species. To prove this, he minutely described the markings of *A. ulmata*, as compared with *A. pantaria*, and showed that the same markings and colours were present in both species, but that in *A. pantaria* they were less pronounced both in size and colour, whilst even in the var. *cataria*, which had scarcely any markings, the peculiarities could still be observed. The paper was illustrated by various specimens from different countries. In the discussion which followed, Messrs. Clark and Boden stated that they had formerly taken *A. ulmata* near Croydon. A vote of thanks, proposed by Mr. Hodges, and seconded by Mr. Smith, was unanimously accorded to Mr. Robson for his kindness in sending the paper.

March 5th, 1891.—Exhibits: Mr. Clark, various species of British bees and wasps. Mr. Milton, *Hybernia rupicapraria*, *H. leucophæaria*, and *Ennomos autumn aria*; the following Coleoptera also, *Dytiscus punctulatus*, *D. circumflexus*, *Pocadius ferrugineus*, *Salpingus castaneus*, *Hypophœus bicolor*, and *Mycetophagus* 4-*pustulatus.* Mr. Heasler, *Tetratoma fungorum*, and a specimen of *Dorcus parallelopipedus* taken on February 21st, the usual time of appearance of this species being June. Mr. Battley, a glass case containing living bees, with their queen, to illustrate his paper.

Mr. Battley read a paper on "The Honey-Bee and Modern Bee-keeping." He first remarked on the great antiquity of bee-keeping, and contrasted the old wasteful methods with the modern system. He then described the varieties of the honey-bee domesticated in Britain—the black bee (*Apis mellifica*) being taken as the type, and the Ligurian, Syrian, Cyprian, and Carniolian bees compared to it in markings and habits. These races interbreed freely with the black bees, and the hybrids are fertile, but always spiteful, thus showing a reversion to the wild bee. He explained the structure of the comb and the theory of the hexagonal cell showing that the cells on the edges of the comb were circular, and that the hexagonal form was obtained by the mutual pressure of other cells. He then gave an account of the life-history of the bees. The workers are imperfect females, and attain the perfect state in twenty-one days from the time the egg is deposited. The number contained in one hive during the summer months is about 25,000. Besides accomplishing the ordinary work of the hive, they feed the larvæ and gather the honey. The drones, or males, come to maturity in twenty-four days, and only exist in the swarming season, their sole use being to fertilize the young queens. The queen, or perfect female, is the mother of all the bees in the hive, and emerges on the fifteenth day. She produces two kinds of eggs, viz., female and male, the latter not being fertilized. If by reason of any deformity, the queen is never impregnated, then her eggs will hatch into drones. The structure and products of the bee were touched upon, especially the honey-sac, wax-pockets, pollen-baskets, and sting. Persons who were stung by bees were recommended to remove the sting, and avoid rubbing the spot. The ailments and enemies of bees were remarked upon, and preventive methods suggested.

In the second portion of his paper, Mr. Battley described some of the appliances that were used in modern bee-keeping; the use of hives, frames, sections, smokers, extractors, wax foundation, etc., being illustrated by specimens on the table. He concluded by giving an explanation of some of the manipulations that were performed under the modern system.

Mr. Milton proposed that a vote of thanks be given to Mr. Battley, which was seconded by Dr. Buckell, and carried unanimously.—G. A. LEWCOCK and A. U. BATTLEY, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —*February* 12*th*, 1891.—Mr. R. Adkin exhibited a long series of *Aplecta occulta* bred from ova obtained from Forres last autumn, and fed up indoors; these were not so dark as the usual Rannoch form. Mr. Tugwell, *Melanippe hastata* showing the two forms, *viz.* from Sussex and from Shetland; also three specimens of *Bisulcia ligustri.* Mr. B. L. Nussey, a fine series of *Thecla pruni* from Northamptonshire. Mr. McLachlan, various species of NOCTUÆ, including *Noctua glareosa*, *Polia chi*, *Agrotis porphyrea* and *Epunda nigra*, taken at Aberdeen. Mr. M. Farrant, a fine var. of *Smerinthus tiliæ.* Mr. T. R. Billups, numerous finely mounted specimens of Coleoptera, Hemiptera, etc. from New Caledonia, collected and sent over by a friend of Mr. Tugwell; also specimens of *Foraminifera* and shells from the drift, brought by Mr. C. G. Barrett from Pembroke. Mr. Billups read some notes showing the almost infinite variety of species discovered amongst the sand by the aid of the microscope. Mr. West, of Streatham, who had also examined some of the same, remarked upon the numerous remains of Zoophytes therein. Mr. T. D. A. Cockerell exhibited specimens of numerous varieties of slugs and read some lengthy notes thereupon. Mr. Auld, a drawing of a variety of *Abraxas grossulariata* from Liverpool. Mr. Tugwell spoke of the abuse of the laws of priority in naming species. An amusing discussion was here started by Mr. West, and supported by Messrs. J. H. Carpenter and H. J. Turner, as to the diffidence evinced by younger members in bringing exhibits, in consequence of the want of interest shown by the older members

February 26*th*, 1891.—Exhibits: Mr. J. M. Adye, a series of *Notodonta camelina* with a specially *dark* variety. Mr. H. Moore, a large South American moth *Erebus odora.* Mr. E. Step, a ♀ *Vespa germanica* alive, taken hybernating during the winter. Mr. Billups claimed to have introduced this species by his capture of 9 ♀'s on January 17th, four years ago, on Wanstead Common. Mr. H. J. Turner, series of *Triphæna pronuba* and *Melanippe fluctuata*, from his garden at Brockley, the latter showing unusual range of variation. Mr. J. T. Carrington who was very warmly received on his return after his illness, made some remarks on some Wasps' nests to be seen at the British Museum. Mr. T. D. A. Cockerell exhibited *Heliothis armigera* var. *umbrosa* from the United States, and made some remarks on the larva of *Leucania uni-*

puncta as the "army worm" of that country. Messrs. C. Fenn, R. South, and H. McArthur exhibited series of vars. of various *Triphænæ* to illustrate Mr. Adkin's paper on the genus. A most interesting paper was then read by Mr. R. Adkin "On the Genus Triphæna." In opening, Mr. Adkin made some remarks on the nomenclature of the genus dealing especially with the species *orbona* (*comes*) and *subsequa* (*orbona*). The six British species were then dealt with separately, the geographical range and degree of variation being dealt with. *T. orbona* was exhaustively dealt with, and some specially beautiful varieties were exhibited. Attention was directed to the allied continental species, Mr. Adkin exhibiting specimens of *lithogriseata* Schiff., from Berlin. Reference was then made to the distribution in the British Isles of *T. orbona* var. *curtisii*, and drew the attention of members to the fine banded forms from Aberdeen, exhibited by Mr. Fenn, and to the splendid series exhibited recently by Mr. J. W. Tutt, and captured by Mr. W. Reid, of Pitcaple. Mr. Adkin illustrated his remarks by a large number of specimens of the species in this genus, comprising individuals from Asia Minor, Dalmatia, Saxony, and various parts of the British Isles. Mr. R. South called attention to the specimens in his own exhibit as illustrating various points in Mr. Adkin's paper. Mr. Tugwell referred to the difference in the width and intensity of the black border of the hind wings in *subsequa* and *orbona*. Mr. Fenn remarked upon the comparative absence of pigment in the hind wings of some bred specimens. It was then announced that the Annual Report would be in members' hands by the first week in March. Mr. C. G. Barrett, F.E.S. was unanimously elected Vice-President.—A. J. HODGES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*March 9th*, 1891.—A paper by Mr. J. Herbert Stott was read on "A parasitic fungus forming its base in the larva of a New Zealand Lepidopteron." The Hon. Secretary, Mr. F. N. Pierce, read a paper entitled "Notes on the genital armature of the genus *Miana*," in which he referred to the recent controversy respecting the distinctiveness of the two species *M. strigilis* and *M. fasciuncula*, and showed by the examination of the structure of the genital armature that they were probably specifically different. The paper was illustrated by the author's preparations thrown on a screen by the aid of the oxy-hydrogen micro-lantern and exhibits of specimens from various parts of the country by the President and members.F. N. PIERCE, *Hon. Sec.*

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